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Dental Digest

July 1950

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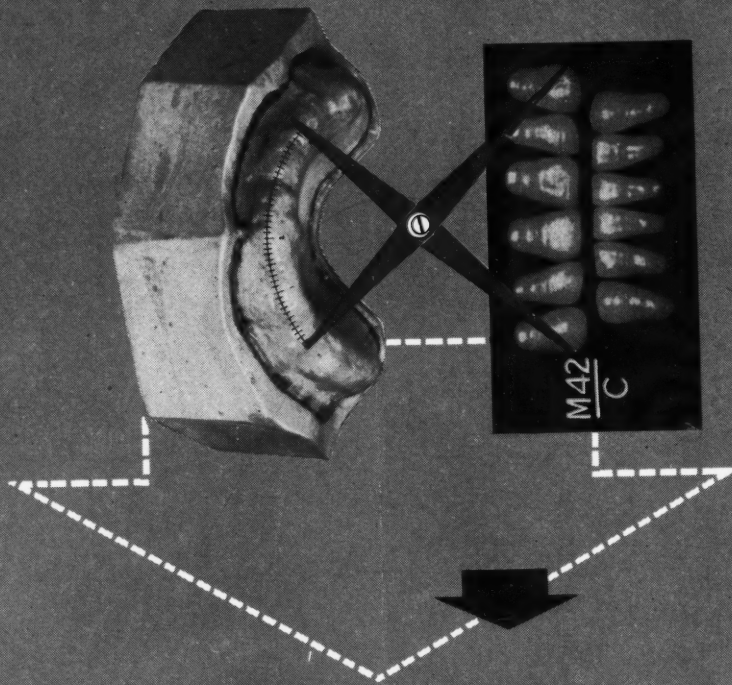
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About Our CONTRIBUTORS

Since publishing THE USE OF CAST PLATINUM AND BAKED PORCELAIN IN DENTAL RESTORATIONS in the June, 1949 issue of DIGEST, THEODORE H. PERLMAN, D.M.D. (North Pacific Dental College, 1923) has continued to experiment with these materials. In his current article, FURTHER OBSERVATIONS ON CAST PLATINUM AND BAKED PORCELAIN RESTORATIONS, added information is reported.

WILLIAM L. SHEARER, B.S., A.B., M.S., D.D.S., M.D. (Creighton University; University of Chicago) is an oral and plastic surgeon with a wide and distinguished teaching and clinical experience to his credit. Doctor Shearer is Emeritus Professor of Surgery at the University of Nebraska College of Medicine. He has published extensively in his special field. His first article to appear in DENTAL DIGEST, THE PRINCIPLES OF ALVEOLECTOMY AND PARTIAL ALVEOLECTOMY, is presented in the current issue.

L. C. HOLTZENDORFF, B.A. (Emory University, 1928), D.D.S. (Emory University 1934) first published in DIGEST in the May 1940 issue. This month Doctor Holtzendorff presents A METHOD FOR PREPARING GELFOAM AND PENICILLIN FOR SURGERY.

J. HAROLD KLOCK, A.B. (University of Florida, 1922), D.D.S. (Baltimore College of Dental Surgery, Dental School, University of Maryland, 1926) is an oral surgeon who has published many articles on the various aspects of gingival disease. With AN EVALUATION OF FUSOSPIROCHETOSIS OF THE GINGIVAE in the current issue, Doctor Klock makes his initial appearance in DENTAL DIGEST.

H. E. BENGTSSON, D.D.S. (Creighton University, College of Dentistry, 1915) is engaged in the practice of institutional dentistry. His article, INDIVIDUALIZED ALL-ACRYLIC DENTURES, in this month's DIGEST describes a procedure for creating in an immediate denture a replica of the teeth extracted.

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Further Observations

on CAST PLATINUM and BAKED PORCELAIN Restorations

THEODORE H. PERLMAN, D.M.D., Chicago

DIGEST

Since the publication in June 1949 in Dental Digest of the article, The Use of Cast Platinum Alloy and Baked Porcelain in Dental Restorations, which introduced a technique for the application of platinum and porcelain in restorative dentistry, many early difficulties have been overcome.

At the time the author's first paper appeared, a representative clinical test of the technique had been conducted. Since then many more restorations using the platinum and baked porcelain method have been completed and careful observation of results has continued.

Successful casting of platinum is not enough in itself upon which to base a new technique and while there have been innumerable successes, there have also been failures. In this article, therefore, the technique is discussed thoroughly, with a view of eliminating failures.

An Exact Technique

The casting of platinum and baking porcelain to its surfaces requires thorough knowledge of the materials and sufficient experience of their use. The technique is exact and no step, no matter how small, should be eliminated.

Platinum Group Metals

Platinum is a soft metal which can be hardened by alloying with iridium, rodium, and palladium.

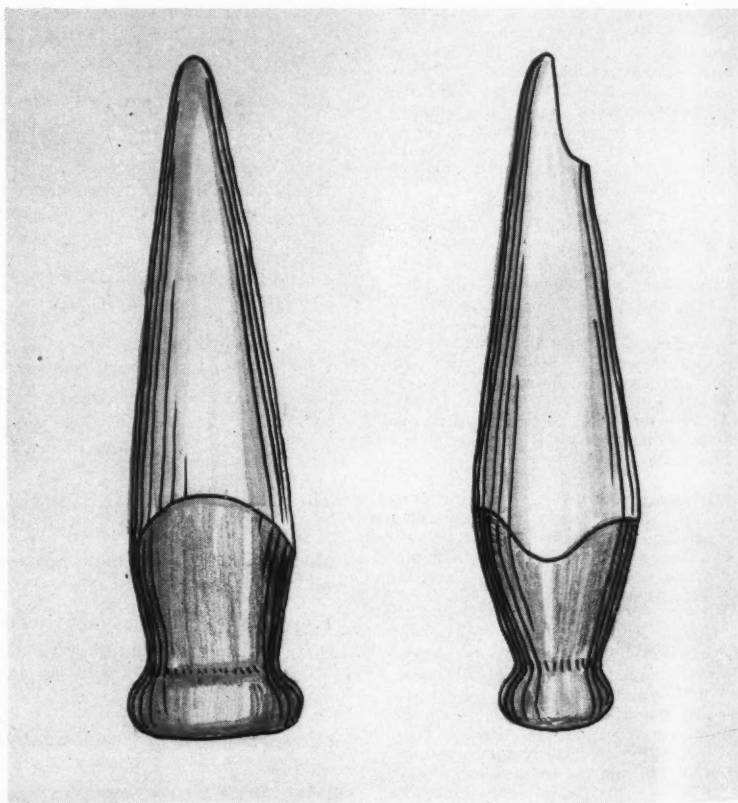
The platinum group metals are easily contaminated. When contamination takes place the metals are unfit for casting dental restorations.

Preventing Contamination — (1) The fact that a metal contains platinum and iridium does not qualify it for this special technique. Utmost

care must be taken by the manufacturer in producing a metal absolutely free from impurities. This is difficult and requires special machinery and additional care.

(2) The metal must not be contaminated in processing castings in the laboratory. Improper investment will contaminate.

(3) Melting must be done with oxygen and gas. Other means of



1. Each die is waxed with green wax reinforced with blue inlay wax and cast in old gold. Note umbrella design on incisal. This produces a retention or undercut so that when impression is taken, the gold cores remain in the impression when removed from the mouth. This simple procedure serves two purposes: (A) It will produce an accurate means for a working model, and (B) if the gold cores fit the prepared tooth it is certain the copper band impression was accurate.

melting will contaminate the metal.

(4) Heating or warming the investment after the pattern is run up and correct wax elimination is imperative for a clean casting.

(5) Cleaning investment from casting must be done in 52 to 55 per cent hydrofluoric acid, kept separate from all other metals in a special container.

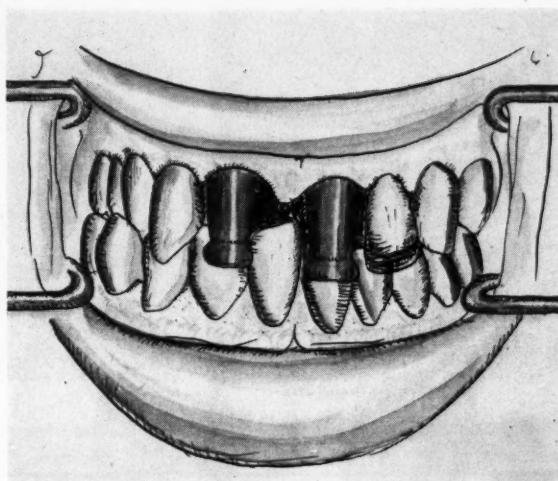
(6) Metal must be melted in a crucible made for melting platinum group metals. No other metals should be melted in the special crucible.

An Accurate Formula Must Be Followed—(1) For uniform results the platinum group metals must be properly and accurately alloyed.

(2) The critical coefficient of expansion has been determined for the baking of porcelain to the metal and requires a specific formula, precisely followed.

(3) No scrap metal or untested metal should be used if consistently satisfactory results are to be attained.

(4) Cooling the ring after casting must be slow and the ring must never be placed in cold water until completely chilled.



2. This drawing represents the mouth and shows the gold cores in place on the prepared central and lateral.

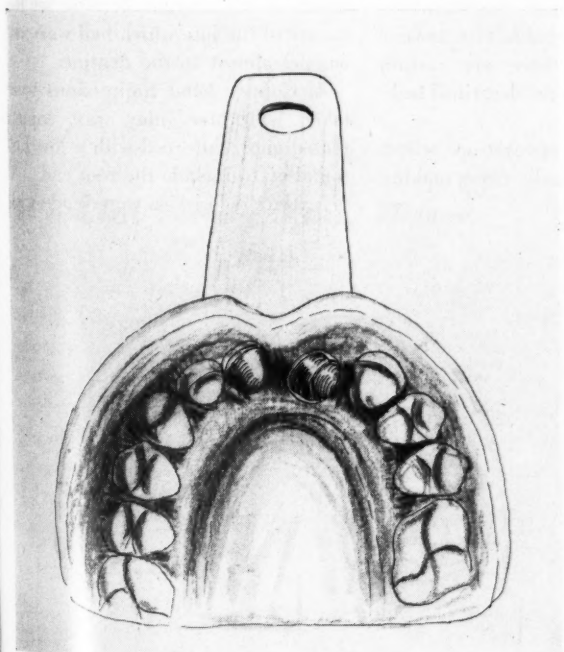
Investments

A variety of investments are available for casting the platinum group metals. Jewelers have cast platinum for many years but their castings are not precise. Dental restorations require a casting (1) of close tolerance for fit, and (2) of a quality that porcelain can be baked to its surfaces.

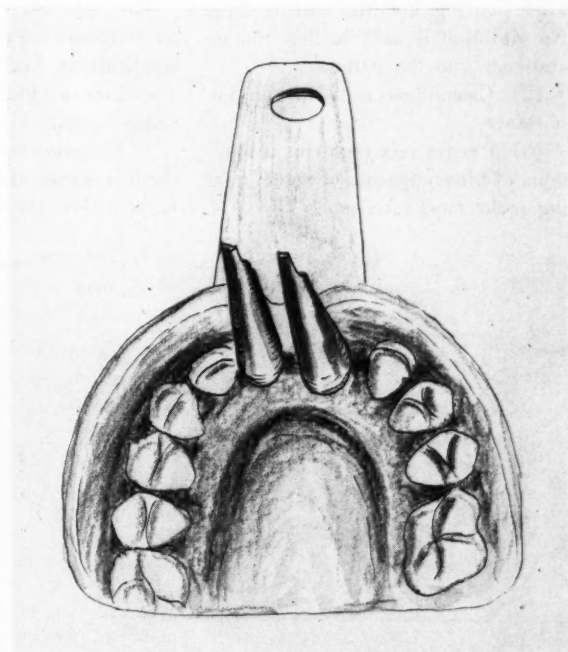
Requirements—(1) The investment must be free from impurities.

(2) The compounding of the silicas must result in a mold (a) sufficiently strong to withstand the impact of metal at a high temperature, and (b) with sufficient crushing strength to overcome the shrinkage of the metal.

(3) Because of the nature of the



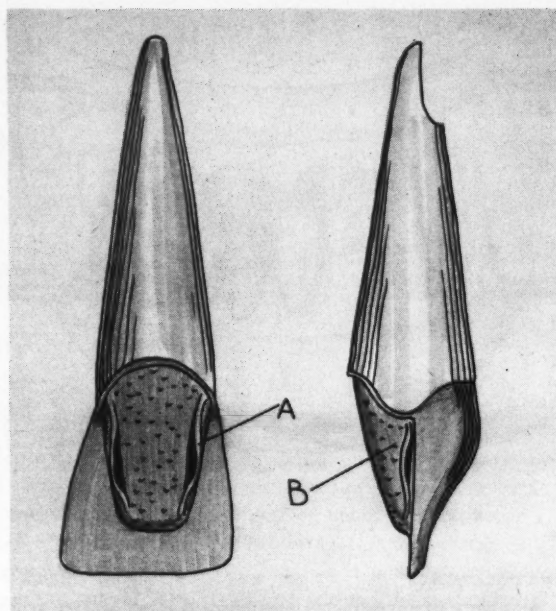
3. Plaster impression of upper mouth as far distal as second bicusps. Note gold cores in place. All undercuts, such as interproximal spaces and bridges, should be eliminated



by filling spots with soft carding wax. The impression can then be removed in one piece.

4. Plaster impression with gold cores in place and dies seated.

5. Finished wax pattern, labial and mesial view. Twenty-eight-gauge wax is applied over entire surface, it is reinforced and built up to contour with blue inlay wax. (A) Retention loops. (B) Retention points. Note that distal and mesial contact surfaces can be built up in porcelain. Note that incisal bevel follows curve of tooth and affords protection to the porcelain.



investment a special type of mixer must be used. The investment is of an extremely heavy consistency and can not be mixed satisfactorily by hand or with the ordinary plaster mechanical mixers.

Method—(1) The mix must be vacuumed in a rubber bowl and also after pouring into the casting ring. No vibration is used to flow the investment into the pattern.

(2) Cleanliness is of prime importance.

(3) A heavy mix requiring a minimum of fifteen minutes of actual mixing is the most satisfactory.

A Variety of Applications

Platinum alloy can be cast to a 28-gauge thickness and will withstand masticating wear indefinitely. High fusing porcelain can be baked to the labial or buccal surface and a long wearing, compatible, esthetic restoration will result.

Cast platinum and porcelain veneer crowns are capable of extensive applications but there are certain situations in which the described technique excels:

1. For anterior restorations where the bite is exceptionally close, making construction difficult.

2. In the place of baked porcelain jacket crowns because of the necessity of lingual thinness and the possibility of breakage.

3. In the place of plastics which are unsatisfactory because of their lack of resistance to wear and their tendency to discolor.

Technique

The following case involves a close bite, diastema, caused by the loss of the upper right central which resulted in a difficult incising bite. This case has been selected for discussion because of these difficulties and describes the method for the application of the technique in simple cases.

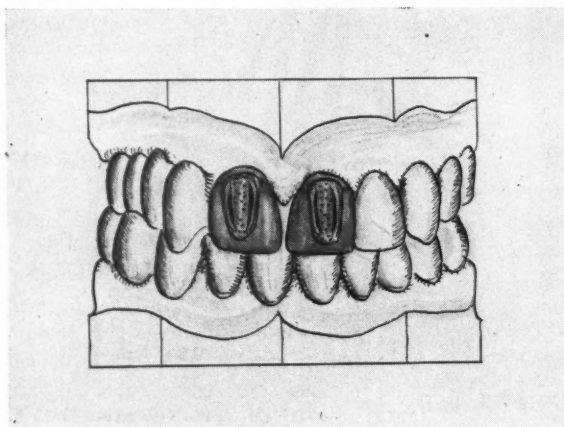
Preparation—1. A complete shoulder preparation was made on both the upper right lateral and the upper left central (Figs. 1 and 2).

2. As much of the distolabial surface of the lateral was removed as was possible without jeopardizing the vitality of the tooth. The distolabial surface of the upper left central was likewise prepared. This was done to give better esthetics to the finished veneers.

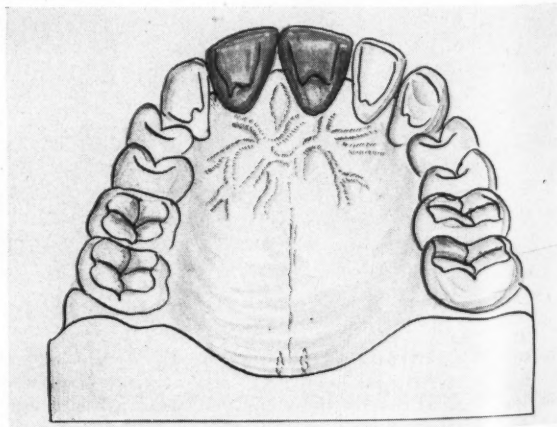
3. It was impossible to remove much of the lingual because of the nature of the bite which had worn the enamel almost to the dentine.

4. Copper band impressions were taken with blue inlay wax, copper plated and reinforced with a low fusing alloy to include the root end.

5. Cast gold cores were made with



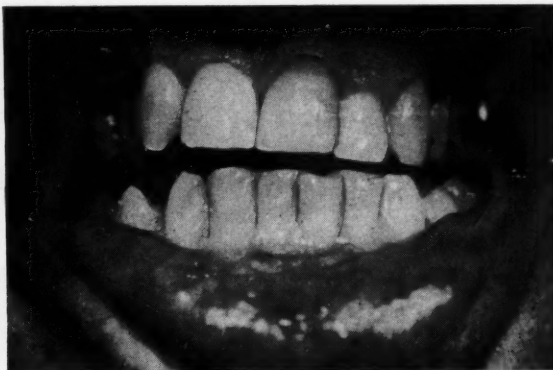
6. Finished castings in platinum alloy on model ready for baking.



7. Lingual view of castings in place.



8. Case before restoring.



9. Finished case.

an umbrella top for the impression. A plaster impression was taken with the cores in place.

6. The dies were seated in the gold cores and a stone model run.

7. An opposing impression was taken and run in stone and the case was mounted.

Waxing—1. The lateral was developed into a central to close the diastema and to balance the esthetics. The carving was developed to give the greatest amount of protection to the porcelain veneer against the incisive bite by beveling the incisal angle.

2. The casting was made of a correctly balanced platinum alloy and was finished, polished, and tried in the mouth for detailed occlusion and contour.

3. High fusing porcelain was baked on the labial and again tried in the mouth for shading and correcting labial anatomy. Porcelain was then fused and the veneer crowns were set with oxphosphate of zinc cement.

Advantages of the Technique

1. Perfect fit.
2. Use of the most compatible ma-

terial possible to place next to mucous membrane.

3. Porcelain will never change color.

4. The platinum alloy is free from oxidation, will always retain its luster and, therefore, is clean.

5. The platinum alloy will wear indefinitely and will completely restore esthetics.

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The Principles of ALVEOLECTOMY and Partial ALVEOLECTOMY

WILLIAM L. SHEARER, M.D., D.D.S., Omaha

DIGEST

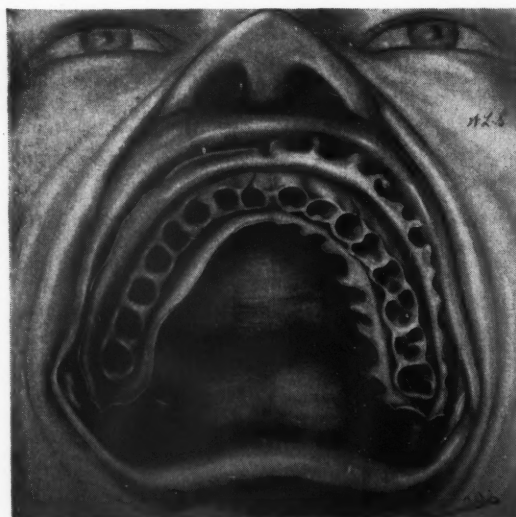
This article discusses the importance of meticulous care of the oral cavity and emphasizes the value of surgery, when indicated,

preceding denture construction. The alveolectomy technique evolved by the author in 1904 is described in detail and directions for postoperative care are given.



1. Left: Appearance of the jaw after simple extraction of teeth.

2. Below left: Right side of the jaw after the jagged alveolar process and mucous membrane have been properly corrected by alveolectomy.



3. The jaw after alveolectomy with sutures in place. Over-and-over whip sutures, grapevine style. (Upper left) Shows frenectomy.



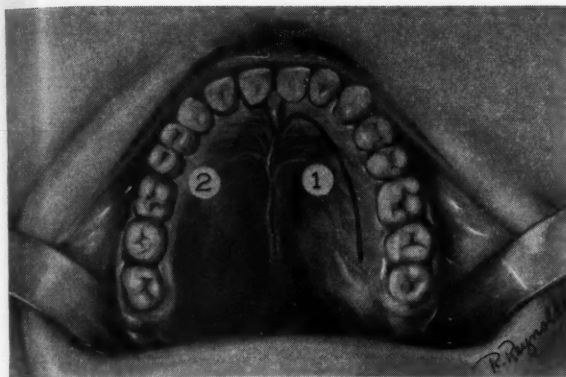
The Nature of the Oral Cavity

Some of the outstanding considerations concerning the nature of the oral cavity are the following:

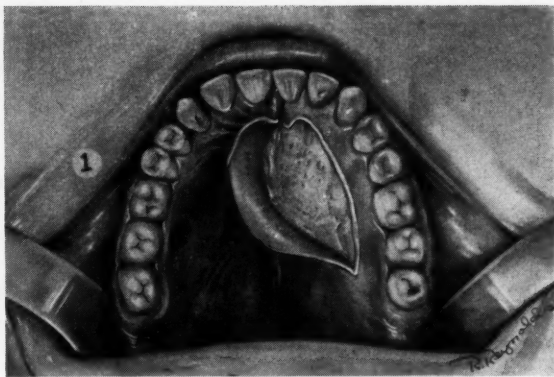
1. *An Impermanent Tissue*—The fact that the alveolar process is a transitory tissue was reported to the dental profession almost fifty years ago when a child of fifteen years of age was observed who had but one tooth in the mouth. Only around this tooth was there development of alveolar process.

2. *No Alveolar Process at Birth*—The alveolar process develops as the teeth develop; it disappears in whole or in part in all instances as the teeth are lost.

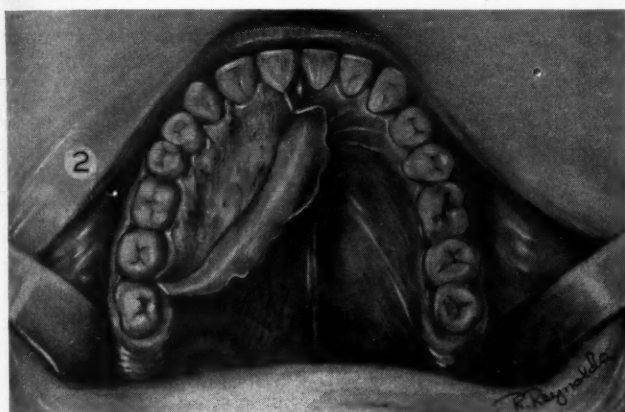
3. *The Osteosclerotic Ridge*—As



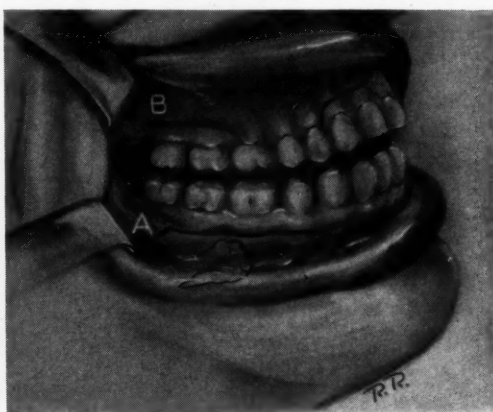
4. Two approaches for removal of embedded teeth in the palate. It is often wise to lay a flap on the buccal as well as on the lingual. This dual approach was presented to the



5. Showing a deeply embedded tooth with the crown remote from the cemento-enamel junction.



6. Showing a tooth with the crown close to the cemento-enamel junction.



7. (A) Incision to approach this problem. (B) Incision for removal of upper first and second bicusps and first molar.



8. Note incision in hard mucosa.

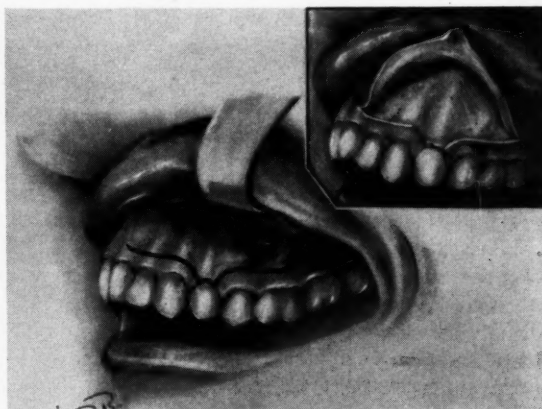
resorption of the alveolar process takes place, there is formed in both jaws, predominating in the lower jaw but also present in the upper jaw, an osteosclerotic ridge.

4. *Characteristics*—The osteosclerotic ridge is usually so sharp that it will cut the ungloved finger when passed over with slight pressure. Were it not for the building up of fibrous con-

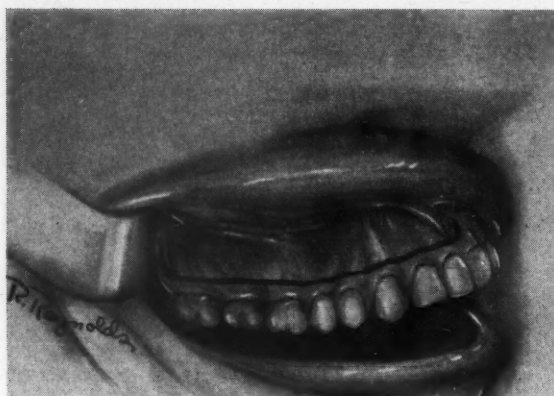
9. *Technique for partial alveolectomy involving one tooth. All partial alveolectomy incisions should be made in the hard mucosa.*

nective tissue cells over these sharp edges, people could not wear dentures with comfort.

5. *Degeneration of the Cells*—If cortical tissue of bone is so hard that



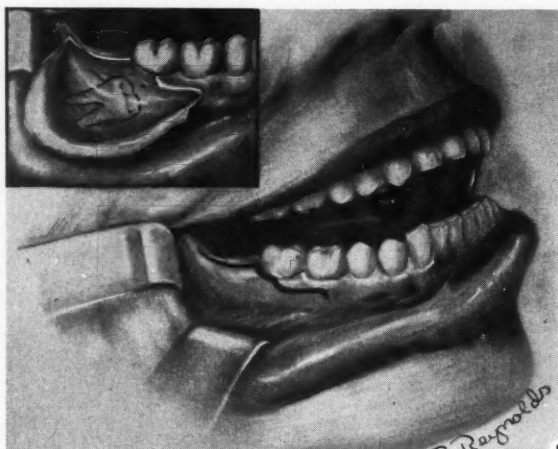
the alveolar process does not resorb, degeneration of the cells of the alveolar process takes place, and until removed, remains in the body of the jaw as a low-grade infection.



10. The maxillary sinus technique.



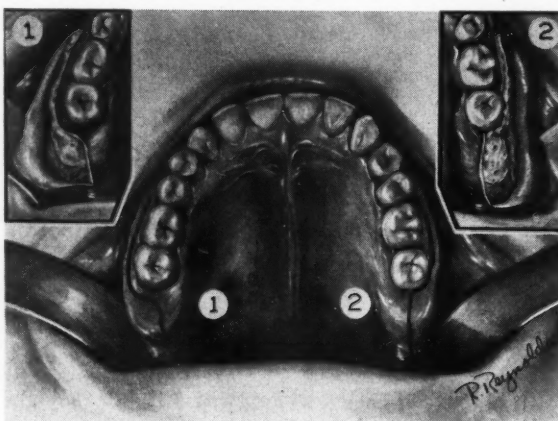
11. Continuing the maxillary sinus technique.



12. Incision for embedded and impacted third molar.



13. Note incision in hard mucosa.



14. Two techniques for the embedded upper third molar.

The Importance of Proper Care

One of the most excellent preventive procedures known to medical and dental sciences is the proper care of the oral cavity.

Total Visibility Necessary—Satisfactory treatment of the human oral cavity demands that complete ocular observation of the whole field must be obtained.

Reflection of the Mucoperiosteal Flaps—The only way to attain total visibility of the oral field during surgery is by the reflection of the mucoperiosteal flaps. (a) On the buccal side the flap must be reflected up to and beyond the root ends of the teeth. (b) On the lingual side the flap must be reflected far enough so that the operator can see perfectly.

Removal of the Mylohyoid Ridges—Where the mylohyoid ridges are prominent, they must be removed so that no undercut will be present which might prevent taking satisfactory impressions.

Fundamental Considerations Underlying Denture Construction

1. The health of the patient must be considered first.

2. Members of the dental profession must think in terms of the relationship of infection of the teeth and jaws to the body as a whole; otherwise they will be regarded as mechanics rather than dental physicians.

3. Infection must be corrected as completely as possible and arches as satisfactory as possible achieved with the remaining tissue.

4. If dentures are built in correct functional balance as taught by Doctor Fred S. Meyer of Minneapolis, Minnesota, the arches will not deteriorate but will remain substantial for many years.

5. The construction of dentures in traumatic occlusion is one of the greatest factors in the destruction of the alveolar arch.

Procedure

1. In the lower jaw every vestige of the alveolar process that it is possible to remove should be removed, in order to provide a solid foundation for a denture.

2. When the flaps are laid back properly in both the upper and lower jaws, the muscles are (1) set up, and

out of the way in the upper jaw, and (2) down, and out of the way in the lower jaw. This measure prevents the flaps from interfering with correctly fitted dentures.

3. When the flaps are laid back, the bony protuberances can be seen and can be smoothed off perfectly, leaving no sharp edges or protuberances that may give the patient trouble. Undiagnosed pain is often produced by bony tubercles left in the jaws following simple extractions which give pain by pressure from the denture on the mucous membrane. Bone surgery is demanded to remove all sharp edges and prominences to avoid future complications.

4. Over-and-over whip sutures of horsehair, placed grapevine fashion, give a smoother approximation of the mucoperiosteal flaps. Horsehair can be left in the mouth indefinitely without sloughing if the ends of the horse-

hair are not buried in tissue. It is the author's experience that no other material can be compared to horsehair for suturing in the mouth.

Postoperative Treatment

1. Following an alveolectomy, hot Epsom salt packs should be placed on the face immediately after returning from the operating room. Nothing encourages rapid, reparative process as well as heat.

2. Cold applications should not be used because cold retards the phagocytic action of the leukocytes. Heat stimulates this action. Doctor Nicholas Senn, of Chicago, has stated that with rare exceptions cold should not be applied to the face following surgery of any kind.

3. Hot salt water irrigations should be used daily.

1226 Medical Arts Building.

Absorbable Hemostatic Agents

BENJAMIN J. JACOBS, D.D.S. and S. STEPHEN RAFEL, A.B., D.M.D., Newark, N. J.

A COMPARATIVE microscopic study of the three absorbable hemostatic agents, (1) fibrin foam, (2) gelatin sponge, and (3) oxidized cellulose, in the sockets of extracted mandibular teeth of a dog was conducted to determine the following:

1. The degree of absorbability of the materials.
2. Their effect on bone and soft tissue healing.
3. The inflammatory response to the agents.

Conclusions

From experiments conducted on one animal the following conclusions resulted:

1. Oxidized cellulose remains as a foreign body in the tissues longest, gelatin sponge, not quite as long, and fibrin foam seems to disappear more rapidly than either of the other implants.
2. Oxidized cellulose disappears between eleven and thirty days, gel-

atin sponge, a little sooner than the cellulose, and as fibrin foam simulates the control specimen after four days, it cannot definitely be determined if the material has been completely absorbed.

3. The exact mechanism by which the implants disappear is not known. Phagocytosis by foreign body giant cells, leukocytes, and the presence of lytic substances appear to play significant roles.

4. Clot formation is retarded by the use of the implants. However, around the fourth day all the materials have been sufficiently invaded by blood elements as to be considered in a state of clot.

5. The predominant inflammatory cells are polymorphonuclear leukocytes, lymphocytes, and monocytes. Inflammation is evident in all specimens including the control, which seems to indicate that the initial inflammatory response may be the result of surgical trauma.

6. Bone resorption and bone deposition, as predetermined by the action of osteoclasts, osteoblasts, and the presence of osteoid in the experimental sections at any time level, are generally similar to the control section at that time level.

7. Bone bridging appears to begin near the crest of the alveolar ridge.

8. Clinical healing of sockets is complete by twenty-six days.

9. Fibrin formation, organization, and fibroblastic activity go on under the protection of the implant.

10. Epithelization is retarded by the use of oxidized cellulose and gelatin sponge. With these agents it takes about twenty-six days for complete epithelization, whereas the control and fibrin foam sections are epithelized by the eleventh day.

From *Oral Surgery, Oral Medicine, and Oral Pathology* 3:374-375 (March) 1950.

A Method of Preparing

GELFOAM and PENICILLIN for Surgery

L. C. HOLTZENDORFF, D.D.S., Valdosta, Georgia

DIGEST

In any dentosurgical operation it is desirable (a) that the space created by the operation be obliterated as soon as possible, and (b) that there be no undue bleeding or chronic infection subsequent to the operation.

It is extremely difficult to operate aseptically in the oral cavity. Most dental surgeons, therefore, rely (1) on the natural reparative processes to effect an uncomplicated healing, or (2) on an agent placed in the operative field to obliterate the space created by the operation and to act as a hemostatic and bacteriostatic agent.

Of the various agents used to obtain the desired effects, gelfoam, in combination with penicillin, sulfanilamide, and thrombin has shown the greatest promise of fulfilling the requirements for an ideal postoperative agent.

The Importance of Even Absorption

It has been shown (1) that solid bacteriostatic agents in the form of pellets placed in the tooth sockets after surgery act as foreign bodies, and (2) that sprays of these substances affect only the surface of the blood clot or are displaced by the flow of blood. However, if the bacteriostatic agents are carried to the depth of the socket as a powder on the gelfoam they are incorporated into the developing blood clot evenly over the entire area of the socket and do not collect in one area and become a foreign body.

Description

Gelfoam is a sterile surgical sponge capable of absorbing and holding 45 times its own weight of whole blood.

Size—Gelfoam is supplied in sections $2\frac{1}{4}$ inches long, $\frac{1}{4}$ inch thick, and $\frac{3}{4}$ inch wide.

Properties—1. When implanted in tissues, gelfoam is completely absorbed in four to six weeks. 2. Gelfoam does not induce excessive scar formation or cellular reaction.

Preparation for Use

Under aseptic conditions the sections of gelfoam are removed from their jars and cut into long triangular or cone-shaped pieces which should be approximately $\frac{1}{2}$ to $\frac{2}{3}$ the size of the socket into which they are to be placed. The size of the pieces should be governed by the different sizes of the tooth sockets (Fig. 1).

Action of the Agent

1. When inserted into the tooth

socket, gelfoam serves (1) as a semi-solid matrix for the blood clot, and (2) as a space obliterator.

2. In large sockets the blood clot formed in and around the gelfoam is rendered more stable by the presence of the material and resists dissolution and displacement.

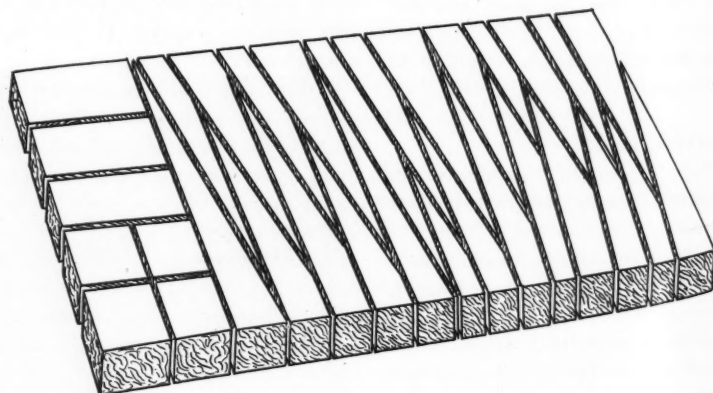
3. The gelfoam also acts as a carrying medium for the penicillin, sulfanilamide, and thrombin.

Associated Agents

The bacteriostatic and hemostatic agents used in conjunction with the gelfoam are the following: (1) Powdered penicillin, 50,000 units, (2) sulfanilamide, 2.5 grams, and (3) 1,000 units of thrombin powder mixed in a sterile container.

Method of Combination—1. The thrombin powder should be thoroughly triturated before it is mixed with the penicillin and sulfanilamide powder.

2. The penicillin and sulfanilamide act as bacteriostatic agents and the thrombin acts as a hemostatic agent supplementing the bacteriostatic action of the gelfoam.



1. The size of the pieces should be governed by the different sizes of the tooth sockets.



2. To ensure sterility, sheet metal may be arranged around the stopper of the bottle to prevent finger contact during manipulation.

3. The penicillin and sulfanilamide used are of a fine powder form such as is used in an insufflator.

Aseptic Conditions Important—1. It is essential that the preparation and storage of the gelfoam and the penicillin - sulfanilamide - thrombin mixture be conducted under conditions as aseptic as possible.

2. Dry heat is the sterilizing agent of choice for forceps, scissors, and storage bottles. Sterilization may be easily effected in the inlay furnace at 400° Fahrenheit for thirty minutes.

3. The storage bottles should be wide mouthed with ground glass stoppers. To ensure sterility, sheet metal may be arranged around the stopper of the bottle to prevent finger contact during manipulation (Fig. 2).

4. The mixture of penicillin-sulfanilamide-thrombin may be replenished when needed. Approximately the same proportions of the three ingredients should be maintained.

Procedure

1. Remove aseptically one or more

cones from the gelfoam bottle and place them in the bottle containing the penicillin, sulfanilamide, and thrombin.

2. The bottle is then agitated so that the gelfoam sponge is impregnated with the penicillin-sulfanilamide-thrombin powder.

3. The impregnated gelfoam cone is removed from the powder bottle and placed within the folds of a sterile exodontia sponge. It is then available for use in the operative field at the termination of the operation.

4. The socket should not be over-filled with cones; space should be left around the sides of the cone for a normal blood clot.

5. After the gelfoam cone is saturated with blood, it should be pressed between the ends of the forceps to express all air bubbles.

Summary

The use of bacteriostatic agents in conjunction with gelfoam has the following results:

1. The space created by the removal of impactions, cysts, neoplasms, or a tooth may be eliminated.
2. Infection is controlled.
3. Bleeding and postoperative discomfort are reduced to a minimum.

Valdosta, Georgia.

THE GOTTLIEB THEORY

For further simplification of the comparative analysis of the Gottlieb concept of dental caries by Doctor Benjamin Patur which appeared in the June 1950 issue under the title, DENTAL CARIES: A RATIONALIZATION OF THE GOTTLIEB CONCEPT WITH THE GENERALLY ACCEPTED CONCEPT, on page 250, column 3, Gottlieb's enamel classifications fall into the following four categories: 1. Normal enamel. 2. Chalky enamel. 3. Cloudy enamel. 4. Transparent enamel.

Also, on page 252 in the description of Gottlieb's micrograph, Figure 3, the classifications are specifically the following: 1. Yellow pigmentation. 2. Cloudy enamel. 3. Chalky (or opaque) enamel. 4. Transparent enamel.

Under the heading, Summary and Conclusion, on page 253, column 3, the divisions of destruction from within are properly the following: a) Cloudy enamel without yellow pigmentation, and b) cloudy enamel with yellow pigmentation.

An Evaluation of FUSOSPIROCHETOSIS of the Gingivae

J. HAROLD KLOCK, A.B., D.D.S., Miami Beach, Florida

DIGEST

During World War II, Major General Robert H. Mills of the Army Dental Corps stated¹ that the incidence of stomatitis Vincent's infection had been slightly more than 3 per 1,000 per month.

Another report from six naval dental officers showed² that individual examinations of 100 routine patients indicated an average of 87 per cent having fusospirochetal infection of the gingival tissue, ranging from mild localized conditions in an otherwise healthy mouth to infections of varying degrees involving the entire mouth.

Etiology and Symptomology

It has been shown by Smith,^{3, 4} and Buest⁵ that except in degree of infection Vincent's infection of the mouth is identical bacteriologically and pathologically with (1) Vincent's angina of the throat, and (2) the more chronic form of pyorrhea. The resistance factor or immunity of the patient, locally and generally, supplies the distinguishing differences of symptomatology.

¹Mills, Robert H.: Dentistry's Contribution to the War Effort, Florida D. J. 15:10 (January) 1944.

²Klock, J. H.: The Prevalence of Fusospirochetal Infection of the Gums, Florida D. J. 17:6 (February) 1946.

³Smith, D. T.: The Role of Fusospirochetal Organisms in Acute and Chronic Infections of the Mouth, J.A.D.A. 23:1343 (July) 1936.

⁴Smith, D. T.: Oral Spirochetes in Fusospirochetal Disease, Baltimore, The Williams & Wilkins Company, 1932, p. 49.

⁵Von Buest, Theodore B.: Spirochetes and Fusiform Bacilla of the Mouth, J.A.D.A. 16:1417 (August) 1929.

The marked disparity of these figures is indicative of the prevailing confusion in (1) terminology, (2) clinical pathology, and (3) bacteriology of this disease.

The figure given by Major General Mills was probably for the extremely acute infections. The other estimates included the subacute and chronic phases of the disease. These states may or may not precede the acute stage and are rarely recognized and treated. The fact that many patients have had advanced fusospirochetal infection of the gingiva without experiencing subjective symptoms or pain, testifies to the validity of the statement.

Invasion of Bacteria—Based on the assumption that the fusospirochetes are anaerobes and are saprophytic in nature, certain local factors or predispositions must be present to alter the tissue tone from normal to make this invasion of fusospirochetes possible. Ample evidence is provided that the fusospirochetes (Vincent's organisms) are present in varying degrees in healthy mouths. Pathogenicity only becomes a reality when the "soil" is fertile. As these bacteria are essentially opportunists, there is no reason to believe that they are primary invaders.

The Disease Considered Endogenous, Not Exogenous—Treatment does not have to be postulated on the premise that the disease was contracted from a drinking cup or unclean

dishes, but the predisposing causes should be discovered and removed.

Treatment is a Dental Problem—Except for cases influenced by systemic factors, the treatment of fusospirochetosis of the mouth is essentially a dental problem. In the acute stage it is easily recognized clinically by any physician or dentist of experience. If the case has been clinically diagnosed and does not respond favorably to treatment within twenty-four hours, we should become suspicious and explore more carefully the differential aspects of the condition.

Subjective Symptoms—The chronic stage of the disease is usually painless and often shows no outward inflammatory signs. Some of the following symptoms are usually present: 1. Fatigue. 2. Lack of energy. 3. Nervousness. 4. Faulty digestion. 5. Sharp or dull pains of an obscure nature in the head. 6. Loss of ambition and interest in work.

A Variety of Lesions—Smith⁶ states that "This group of anaerobes is surpassed only by treponema pallidum and mycobacterium tuberculosis in the wide variety of acute and chronic lesions it produces in various parts of the body."

Roentgenographic Diagnosis—Chronic fusospirochetosis of the mouth, studied roentgenographically, will usually show destruction of the osseous supporting structures of the tooth. This in itself, however, cannot alone be depended upon for diagnosis as physiologic recession of the tissue, although nonpathologic, will present the same picture roentgenographically.

Positive Diagnosis—The only cri-

⁶Smith, D. T.: Oral Spirochetes in Fusospirochetal Disease, Baltimore, The Williams & Wilkins Company, 1932, p. 9.

terion for positive diagnosis is the clinical examination: 1. The soft tissue attachment to each tooth is examined and if a pocket exists the patient may be said to have fusospirochetal disease to some extent.

2. When there is (1) organic union of soft tissues to the cementum of the teeth, and (2) return of normal tissue tone with no other irritating factors present, the patient may be considered to be free of the disease, and then only because the mouth is free of incubation zones.

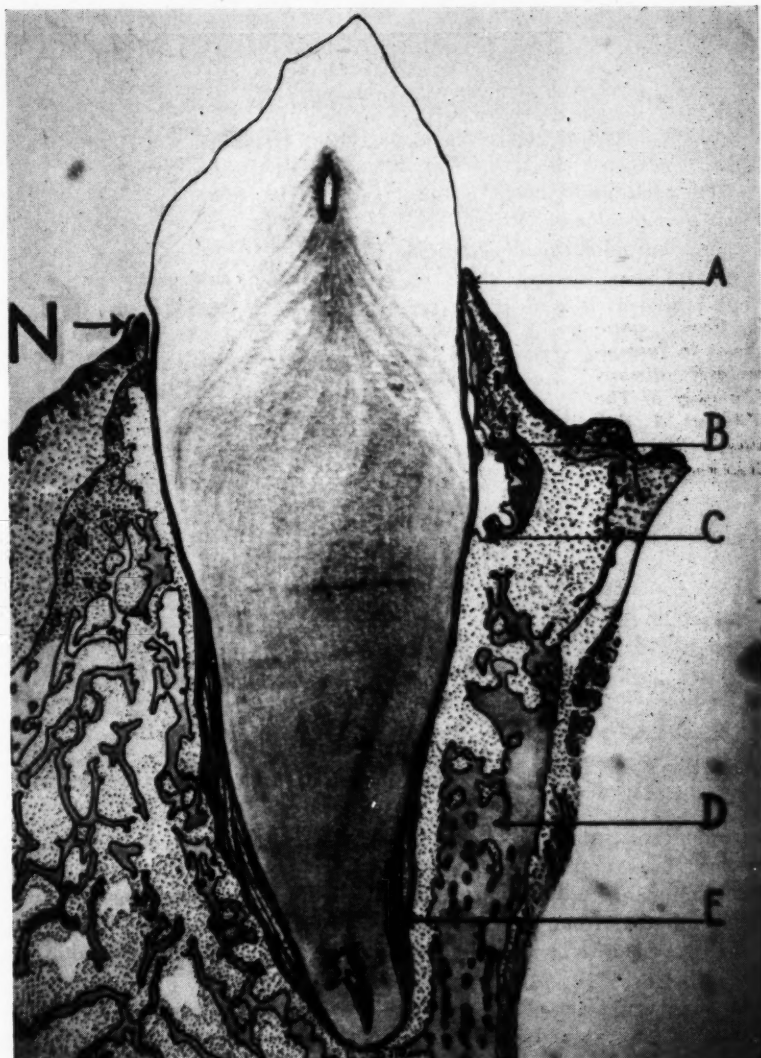
Sources of Pathogenicity—Incubation zones that lend to the pathogenicity of these otherwise harmless organisms are (1) gingival pockets, (2) faulty dentistry, (3) deposits of calculus on the teeth, (4) partly impacted teeth, (5) faulty occlusion, (6) laxity in hygiene, (7) factors such as scurvy, pellagra, syphilis, sensitivity to drugs or other diseases which alter the tissue zone and permit a superimposition of fusospirochetal infection in the mouth or throat.

The Gingival Pocket

Figure 1—(A) illustrates the opening of a gingival pocket which may not be visible. (B) shows where calculus is commonly deposited. (C) shows the base of the pocket. Unless the area from (A) to (C) is eliminated, an incubation area is created. Despite the use of (1) intravenous spirochetocides, (2) antibiotics, or (3) topical applications, the pathogenicity of the otherwise normal flora of the mouth will persist. Normal tissue attachment is seen at (N).

Figure 2—Illustrates actual invasion of weakened tissue by spirochetes. An area of necrosis at the outer surface of tissue is seen at (A). At (B) a few spirochetes are seen deep in the healthy areas. They open the tissues for the invasion of various types of organisms with which they occur symbiotically, such as (1) streptococci, (2) staphylococci, (3) fusiform bacilli and others. Smith⁵ believes that the streptococcus would be harmless as a factor in focal infection were it not for the spirochetes that open the avenues of invasion.

⁵Smith, D. T.: Oral Spirochetes in Fusospirochetal Disease, Baltimore, The Williams & Wilkins Company, 1932, p. 36.



1. (A) The opening of a gingival pocket that may not be visible. (B) Where calculus is commonly deposited.

Not Superficial Diseases—The illustration shows that in time fusospirochetal infections actually destroy tissue beyond repair. This may explain the phenomenon of recurring infections following treatment. Where infection is of long standing the logic of surgical removal of the old tissue and the regeneration of new and healthy tissue should be obvious.

Communicability Questioned

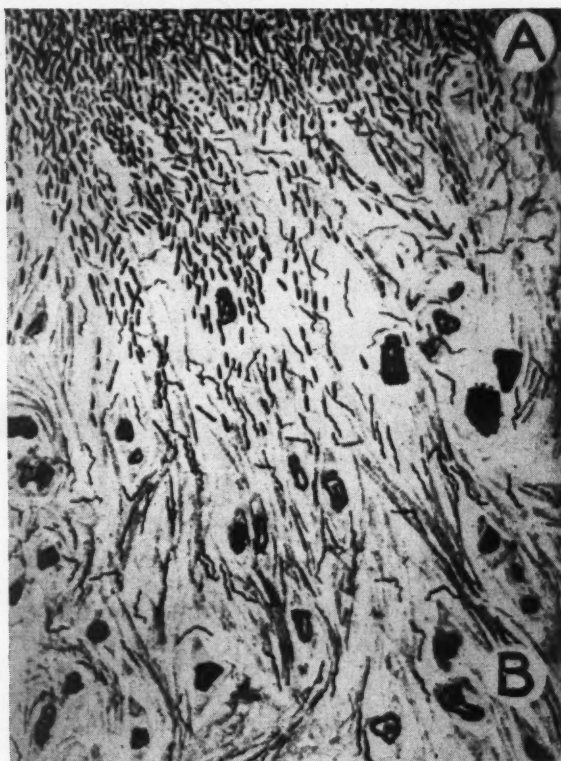
1. The commonly accepted conception of fusospirochetosis of the mouth

is that it is a contagious disease:⁸ "The contagiousness of the disease is illustrated by its occurrence in several members in the same family, or in the inhabitants of a college dormitory, or, and this is of particular interest at the present time, in a military unit."

2. By this reasoning, dental caries and pyorrhea might also be considered to be contagious. No authority seems to claim that so-called pyorrhea is contagious although bacteriologically and pathologically pyorrhea is identical to the acute forms of so-called Vincent's infection, except in degree. According to Buest,⁵ "I

⁸Editorial, K. H. T., Dental Survey 20:254 (February) 1944.

2. Oral spirochetes in fusospirochetal disease. (Courtesy of The Williams & Wilkins Company, Baltimore.)



have observed, drawn and photographed these organisms for years, yet I am unable to differentiate Vincent's infection from filth pyorrhea by the organisms present in the smear."

3. Rosebury⁹ states, "The circumstances of etiology and pathogenesis of Vincent's infection suggest that it is probably not communicable and there seems to be no clear or convincing, direct, or other evidence to the contrary."

Efforts to Communicate the Disease are Unsuccessful—1. Bergeron¹⁰ attempted in 1859 to transmit the "ulcerative stomatitis of soldiers," without success.

2. The author has tried on many occasions to infect himself from the most virulent cases of fusospirochetosis without success.

3. King¹¹ used exudate from the infected socket of a patient with diffuse ulceromembranous gingivitis (fusospirochetosis) transferring im-

mediately to his own mouth. An interdental papilla was first traumatized and King had purposely neglected the hygiene of his mouth and limited his intake of vitamin C. No gingivitis developed.

4. Schwartzman and Grossman¹² attempted to transfer the infection (acute gingivostomatitis) from the mouth in seven cases, positive both bacteriologically and clinically, to eleven cases with intact mucous membranes of mouth and throat, but also met with failure.

Theory of Direct Contact—One theory of communicability is that although the fusospirochetal organisms can be demonstrated in a healthy mouth, it is only by direct contact, such as kissing, that a more virulent strain of organism is introduced, resulting in the infection. It can be shown, however, that acute fusospirochetal disease is found in all cases of acute pericoronitis (infection around the crown of a tooth, usually an erupting third molar) often in an otherwise healthy mouth. Despite the fact that

in this case the healthy tissues are exposed to virulent organisms, the infection is usually confined to the immediate area.

Treatment—In most cases removal of the tooth results in disappearance of the disease without medication or other therapy.

Evidence Refuting Theory of Communicability—Patients are often hospitalized and isolated with this disease, sometimes only because of a positive smear. This procedure, based on a blind acceptance of the communicability theory, was responsible for the loss of millions of man hours and the overburdening of hospital facilities during the last war.

The theory of communicability is refuted by the following facts:

(a) The literature offers no acceptable proof of communicability.

(b) All efforts to communicate the disease have failed.

(c) Persons most likely to contract the disease are dentists who have fusospirochetal organisms blown in their faces daily (drying out cavities) and yet the author has been unable to find any case recorded where a dentist contracted this disease from a patient.

(d) Most cases of fusospirochetosis of the mouth in the incipient stage can be cleared up (1) by balancing the occlusion, (2) scaling, and (3) by instituting massage without medication, which demonstrates that the disease is not possible when tissue tone is at a high level.

Medication Evaluated

Before selecting the medication of choice, the following questions should be answered: 1. What is the objective of treatment? 2. Is the objective of treatment to destroy all of the fusospirochetal organisms in the mouth? 3. Will the prognosis be better if the etiologic factors are determined and eliminated?

Improvement of Tissue Tone Important—Medication, either locally or systemically, will reduce the acute infection to chronicity, but to eliminate the disease the real task is to discover the causative factors and institute proper stimulation, hygiene, and

⁹Rosebury, Theodor: Is Vincent's Infection a Communicable Disease? *J.A.D.A.* 29:833 (May) 1942.

¹⁰Bergeron, E. J.: *De La Stomatite Ulcereuse des Soldats Paris, Labe*, 1859.

¹¹King, J. D.: *Lancet* 2:32 (July 13) 1940.

¹²Schwartzman, J., and Grossman, L.: *Arch. Pediat.* 58:515 (August) 1941.

home care. The elevation of tissue tone following these measures will usually make the mouth resistant to the pathogenic invasion of the otherwise normal oral flora.

Arsenicals are Ineffective—It has been shown¹³ that intravenous injections of arsenicals often cause an acute exacerbation of fusospirochetel infection. It is generally agreed that the arsenicals are to some extent dangerous drugs and are associated with a definite mortality rate.

Objection—Arsenic therapy, like other medication, reduces the acute infection to chronicity and does nothing to remove the etiologic factors. A chronic fusospirochetosis of the mouth is more subtle than the acute phase, is rarely recognized, and, therefore, usually escapes treatment.

Medicative Therapy Based on a Disproved Theory—Most medicative therapy is predicated on the theory that (1) fusospirochetel disease is caused by a primary invasive pathogen, and (2) that the disease can be cured by destroying the offending organisms by direct contact with a drug. This theory precludes the possibility that fusospirochetel organisms are the normal inhabitants of a healthy mouth—a fact generally accepted by dental pathologists.

The Smear

1. The belief that a so-called positive smear of the mouth is indicative of a diagnosis of fusospirochetel disease is widely held despite evidence to the contrary. 2. The disease is reportable by public health officials in many states on the basis of a positive smear.

Value of the Smear—Most authorities agree that the normal healthy mouth will yield a positive smear. Rosebury¹⁴ found that fusospirochetel organisms occurred generally, if not universally, in mouths; and Smith¹⁵ states that by careful scraping the organisms can be recovered from nearly every adult gingiva. As most investigators accept this point of view, the only value of the smear in diag-

nosis would be in determining (1) the number, or (2) the character of organisms in the field.

Supporting Evidence—1. According to Francis,¹⁶ "Arguments that a certain definite percentage of the organisms must be present in the mass of the oral flora for a positive diagnosis are not well supported."

2. Lyons¹⁷ found that smears from unhygienic, though otherwise healthy mouths, offer pictures indistinguishable from those of Vincent's infection.

3. Lyons¹⁸ established that the use of smears as an index of therapeutic progress is also a questionable procedure.

4. Lichtenberg¹⁹ states: "The value of diagnostic smears for Vincent's organisms as a means of establishing a pathogenic relationship of these organisms to a suspected lesion is questioned."

A Conservative Summation—Hirschfeld²⁰ says in part: "With all these facts demonstrating that so-called positive bacteriologic findings are not always positive, nor are negative ones negative, it is evident that the diagnosis of Vincent's infection of the mouth is best determined in most cases by the clinical symptoms and, where there is doubt, by a differential diagnosis, other than bacteriologic, from conditions it may simulate."

Patients Often Treated Unnecessarily—Acceptance of the value of the smear as a positive factor in diagnosing fusospirochetel disease of the mouth has resulted in (1) unnecessary treatment of patients with healthy mouths, and (2) dismissal as cured of those with the disease when clinical examination would prove that the disease is present in the chronic form.

The clinician who depends upon the smear for diagnosis (1) fails to recognize the importance of incubation areas in the mouth, or (2) still accepts the disproved theory that fusospirochetel disease of the mouth

is the result of the invasion of a primary pathogen.

Antibiotics

Antibiotics have a place in the treatment program, but a cure cannot be attained by using them alone. In the acute stage of fusospirochetosis they are useful (1) to inhibit the virulent course of the disease, and (2) to reduce it to a stage of chronicity and thereby eliminate the acute systemic aspects.

The Use of Penicillin—Penicillin may be used in the form of troches and systemically in large doses by mouth or, preferably, by injection. For patients who are sensitized to penicillin, aureomycin may be used in certain cases with success.

Dosage Must be Carefully Planned—The dosage of aureomycin must be carefully observed as it may produce severe gastric disturbances. In such cases where an antibiotic is indicated, chloromycetin may be used and will usually not cause gastric disturbance. The danger of physicians and dentists using the antibiotics as a cure-all cannot be overstressed.

Suggested Formula of Therapy

The disease formerly called Vincent's infection is here referred to as fusospirochetosis of the gingiva as *Trepone* *Vincenti* is only one of many treponemata with similar characteristics found in the mouth, such as *T. macradentium*, *T. microdentium*, or *T. buccali*. There is no evidence that they, or the fusiform bacillus, are pathogenic unless associated symbiotically with (1) numerous types of streptococci, (2) staphylococci, (3) spirillae, and (4) other organisms usually found in a normal mouth. The presence of the fusospirochetel group of organisms in the normal mouth is supported by evidence.

Associated Factors

F=organisms associated with fusospirochetosis;

X=other organisms, known or unknown, in the mouth;

F + X=the flora of normal gingivae;

(Continued on page 315)

¹⁶Francis, F. D.: Vincent's Infection, J.A.D.A. 28:1297 (August) 1941.

¹⁷Lyons, H.: Dental Science and Dental Art, Philadelphia, Lea & Febiger, 1939, p. 441.

¹⁸Lyons, H.: Dental Science and Dental Art, Philadelphia, Lea & Febiger, 1938, p. 447.

¹⁹Lichtenberg, H. H.; Werner, M.; and Luek, E.: J.A.M.A. 100:707 (March 11) 1933.

²⁰Hirschfeld, Isador: Treatment of Vincent's Infection of the Mouth, J.A.D.A. 29:1153 (July) 1942.

¹⁴Ludwick, W. E.: Evaluation of Bismuth and Arsenicals in the Treatment of Gingivitis, U.S. Nav. M. Bull. 13:584 (March) 1944.

¹⁵Rosebury, Theodor: Is Vincent's Infection a Communicable Disease? J.A.D.A. 29:824 (May) 1942.

¹⁶Smith, D. T.: Oral Spirochetes in Fusospirochetel Disease, Baltimore, The Williams & Wilkins Company, 1932, p. 68.

Individual ALL-ACRYLIC DENTURES

H. E. BENGTSOON, D.D.S., Norwalk, California

DIGEST

This article outlines a technique for reproducing the individual tooth form in dentures. The position of the teeth on the ridge, the vertical dimension, and the anatomic relation between the mandible and the maxillary as it existed before the teeth were removed are maintained.

Since the introduction of acrylic material, a simple and rapid method for obtaining an exact duplication of the patient's teeth has been developed. The technique can be completed in the

office or in the laboratory from impressions made by the dentist.

Only the upper denture is discussed in this presentation. The technique for the lower denture is accomplished in a similar manner.

Applications

This technique is applicable where most of the teeth are structurally sound and esthetics are desirable, but where the teeth must be sacrificed because of periodontal disease.

1. Alginate impressions are taken for a study cast and the duplicating of the teeth in wax. The matrixes of the teeth in the impression are rapidly poured with hot baseplate wax.

2. A V-shaped groove is cut in the wax to facilitate proper positioning of the wax teeth on the stone cast formed by pouring the remainder of the impression in stone.

The Impression

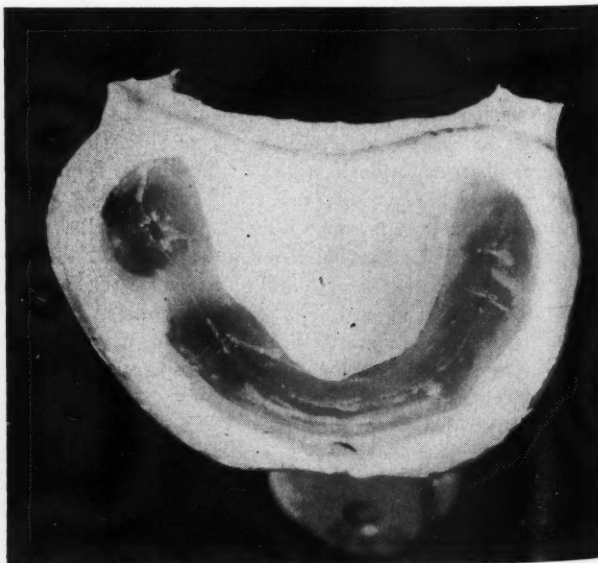
Two good sets of impressions in alginate are taken (Fig. 1). One set is used for comparison casts, the other for the duplicating of the wax teeth.

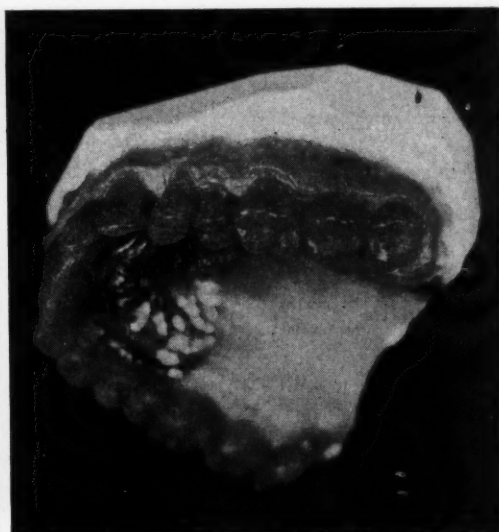
Technique

Initial Steps—1. Thoroughly scale and clean all the teeth. 2. Extract all broken down teeth and roots. 3. Restore the minor cavities with inlay wax and carve to occlusion. 4. Take two sets of alginate impressions.

Teeth Duplication—1. Pour hot baseplate wax rapidly into the duplicating impression (Fig. 1) filling matrixes all around to about $\frac{1}{8}$ inch above the gingival margins.

2. Cut a V-groove in the wax directly above the crest of the ridge from tuberosity to tuberosity which provides a landmark in the cast for the correct positioning of the wax teeth on the ridge of the cast (Fig. 2).





3. The remainder of the impression is poured in stone. When the cast is removed from the impression, the wax duplication of all the teeth, positioned in their respective relations on the ridge of the cast, will be the result (Fig. 3).

Replace Missing Teeth—The buccal, labial, and palatal areas of the cast (Fig. 3) are waxed with one thickness of sheet wax and carefully joined to the gingival margin of the wax teeth. At this stage, missing teeth are filled in with stock acrylic teeth or suitable wax teeth. Each tooth will be hand articulated into position (Fig. 4).

Flasking—1. The entire wax-up (Fig. 4) is flaked in the usual way, but it is well to paint all the wax teeth with a stone index to $\frac{1}{4}$ inch thickness which will effect easy de-flasking and better curing of the acrylic teeth against the hard plaster matrix. Use sepralac, and finish pouring the remainder of flask. The use of a sectional flask (Raiche) is advised.

2. Leave the flask in boiling water for a short time (five or six minutes).

3. Open the flask, peel out all softened wax, rinse matrixes and walls thoroughly with clean boiling water,

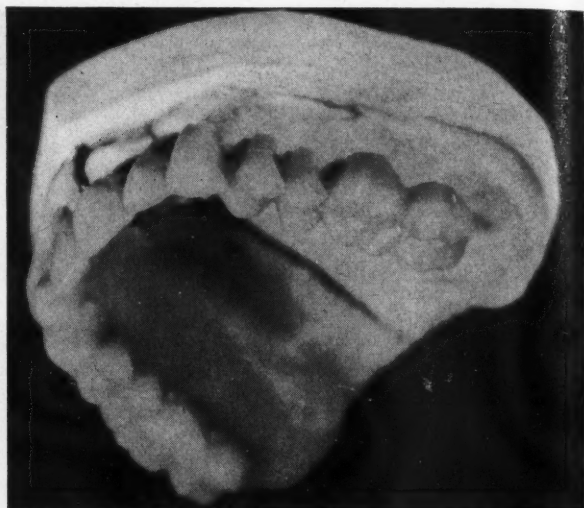
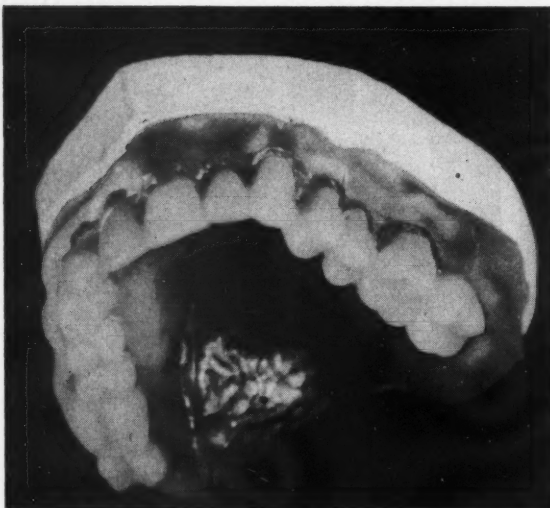
3. The teeth as reproduced in wax in their respective positions on the cast.

4. The labial, buccal, and palatal areas are now given the necessary thickness of wax and rugae duplication.



5. Shows position of reinforcement bar.

6. Trimming the acrylic teeth.



and swab out with carbon tetrachloride. (The matrixes and wall must be clean from wax film).

4. While the case is hot, paint the matrixes and walls with two coats of foil substitute and let cool.

Blending Shades—1. After selecting the desired shades of tooth acrylic, the cusps and incisal portions of the matrix are flooded with liquid monomer by means of a medicine dropper.

7. Shows position of acrylic teeth on working cast, base sections partly cut away from teeth to afford easy removal of base sections.

8. Base sections removed and final wax-up on cast from last impression. Ready to process and finish.

2. The incisal powder is sifted into the matrixes just above the cusp and incisal line; liquid and body powder are again added, then liquid and gingival powder added to above cervical margins. At each addition, while in a semiliquid stage, the shades should

be stippled by a small steel instrument to blend shades and at this stage a previously shaped steel reinforcement bar can be embedded just above the teeth and below the crest of the ridge (Fig. 5).

Creating Esthetics—1. About five



9. Acrylic teeth in position in a sectional flask.



10. Right: Shows separation of the flask after processing.

minutes after the acrylic powder is sifted into the matrixes (Fig. 5) place a sheet of cellophane and a cotton roll over the acrylic and close the flask under slight pressure for twenty minutes.

2. Open the flask, carefully peel out the entire complement of teeth (the acrylic is in a rubber-like condition). Trim the excess to the gingival margin (Fig. 6).

3. At this point esthetics can be accomplished by characteristic staining.

Construction of Base—1. The acrylic teeth are now repositioned in their matrixes and the flask is closed.

2. Pink acrylic may be used as a base if the case is to be used as an immediate denture. The author prefers a clear base and uses the case as a denture tray for a final impression after the teeth have been extracted.

Cold pack acrylic can be used with less expenditure of time.

3. The teeth and base are processed in the usual way.

4. Deflask (Fig. 10) and prepare the denture as a tray for the final impression by cutting the base away from the acrylic teeth with a fissure bur, leaving several narrow attachments to hold the base to the teeth while used as a tray (Fig. 7).

5. The teeth are now extracted and necessary surgery is performed.

6. The denture tray (Fig. 7) is carried to position and tested for high spots and muscle attachments.

7. The denture tray is filled with an easy flowing paste and carried into position. Pressure is used *only* in the palate area until the palate tissue can be observed through the clear palate. Have the patient position the denture into exact centric by

easily closing lower teeth into the upper occlusion of the denture. Muscle trim.

Final Steps

1. The denture with the finished impression is removed and poured in stone.

2. The base is broken away in sections, excess impression material is removed and replaced with a desirable thickness of wax. The palate is broken out last and replaced with two thicknesses of wax (Figs. 7 and 8).

3. A perfect reproduction of the rugae can also be made at this time by burnishing tin foil into the palate of the study cast. Run hot wax into depressions on the palate side of the foil, and reposition.

4. Wax up as usual and the case will be ready for processing.

Norwalk State Hospital.

An Evaluation of Fusospirochetosis of the Gingivae

(Continued from page 311)

LPF=local predisposing factors;
GPF=general predisposing factors.

Types of Gingival Lesions

Pathogenic gingival lesions may be classified as follows:

Class 1. $P=LPF+F+X$

- (a) acute
- (b) subacute
- (c) chronic

Class 2. $P=GPF+F+X$

- (a) acute
- (b) subacute
- (c) chronic

Class 3. $P=LPF+GPF+F+X$

- (a) acute
- (b) subacute
- (c) chronic

Class 1—A local predisposing factor plus an otherwise normal flora will produce pathogenicity. In Class 1, a chronic gingivitis might be due to traumatic occlusion which would be represented by the Formula $LPF+F+X$. The therapeutic attack would be on LPF by (1) proper equilibration, (2) elimination of

pockets, and (3) the institution of home care. The factor $F+X$ would then become nonpathogenic and return to normal. If antibiotics, medications, or mouthwashes are depended upon to cure this type of case, the attack is made on $F+X$, which is entirely incorrect except as an adjunct.

Class 2—The main therapeutic approach in the case of a person with anemia and an acute fusospirochetosis would be directed toward GPF (the anemia). $F+X$ would subside if there were no local incubation zones or other local factors involved.

Class 3—An illustration of Class 3 would be a person suffering from acute fusospirochetosis who has a syphilitic background and traumatic occlusion as etiologic factors. The therapeutic approach to this problem would be toward LPF (traumatic occlusion) plus GPF (the syphilis). If there were no other local factors involved, the mouth would return to normal with treatment directed along these lines.

Conclusions

(1) The fusospirochetal organisms are normal inhabitants of a healthy mouth and are not primary invaders.

(2) The disease is the result of lowered tissue tone due to local, or general predisposing factors.

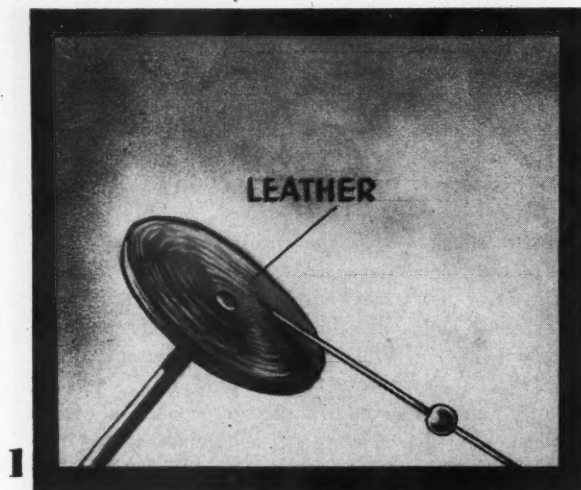
(3) There is no proof that the disease is communicable and efforts to communicate it have consistently failed.

(4) The value of smears is questionable and efforts to isolate the patient are misdirected.

(5) Medication is of minor importance in treatment and antibiotics are recommended only as adjuncts.

(6) The criterion for judging the cure of fusospirochetosis of the mouth is that all oral incubation areas and systemic predisposing factors have been eliminated and normal tissue tone restored, thereby precluding the possibility of recurrence.

605 Lincoln Road.



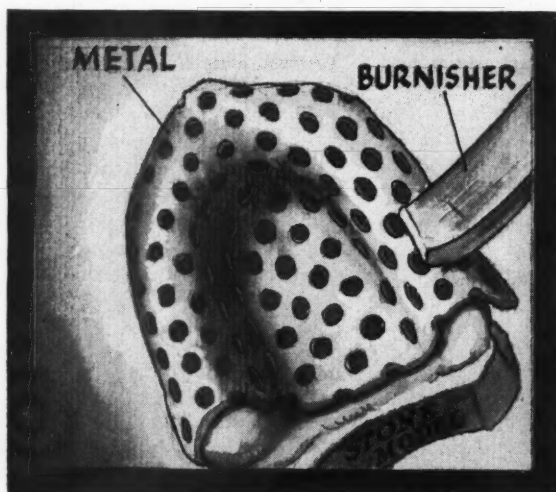
Clinical and Laboratory

Sharpening an Injection Needle

Samuel Stein, D.D.S., Poughkeepsie, N.Y.

1. Cut a piece of sole leather in a circular form to a $1\frac{1}{4}$ inch diameter. Mount on an ordinary mandrel. After the needle has been honed on an Arkansas stone, hold it *very lightly* against the revolving leather "strop" to reduce the feather edges and produce a sharp point and bevel.

1

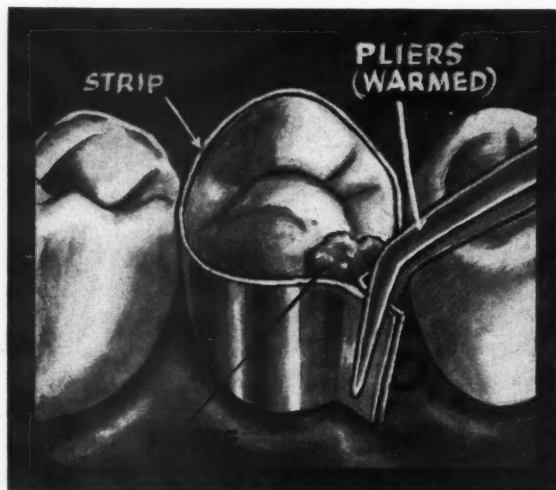


Custom Made Perforated Tray

Walter W. Sage, D.D.S., Rochester, N.Y.

2. Adapt baseplate wax over a stone model that has been made from a preliminary impression. Use the wax as a pattern and cut a piece of perforated soft steel or aluminum plate to the approximate size. Swage and burnish the perforated metal to the cast to form an individual impression tray.

2



Matrix for Acrylic Restorations

J. C. Shotton, D.D.S., Cleveland

3. Adapt a strip of plastic matrix to the tooth. Apply a little of the soft acrylic mix at the joint on the buccal. Draw the strip tight and seal the two ends with the *warm* points of the pliers. The continuous band formed makes a good matrix.

3

READERS are Urged to Collect \$10.00

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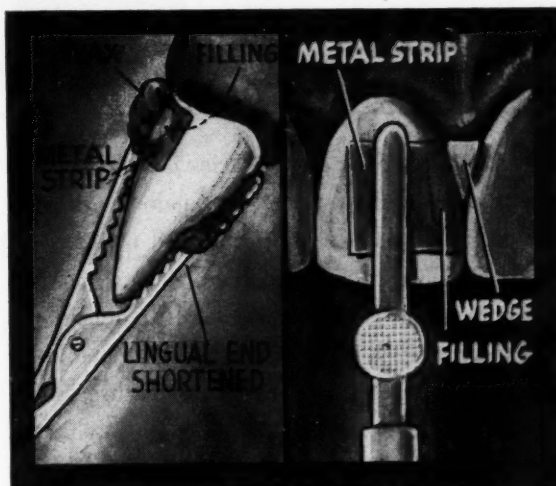
You do not have to write an article. Furnish us with rough drawings or sketches, from which we will make suitable illustrations; write a brief description of the

SUGGESTIONS . . .

A Tension Matrix Holder

Winston C. Norcross, D.M.D., East Walpole, Mass.

4. Remove the alligator type snaps from a dental napkin holder. Shorten the beak opposite the finger rest. Modeling compound should be used over the matrix strip and will be held in secure position by the alligator snap.

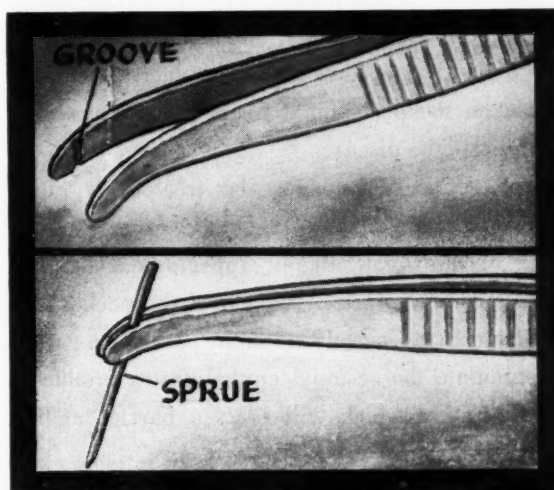


4

A Sprue Holder

R. L. Morrison, D.D.S., Washington, D.C.

5. Cut a groove in one beak of a short heavy pair of pliers. When inserting a hot sprue pin in a wax pattern, the pin is held securely in the groove in the beak of the pliers.

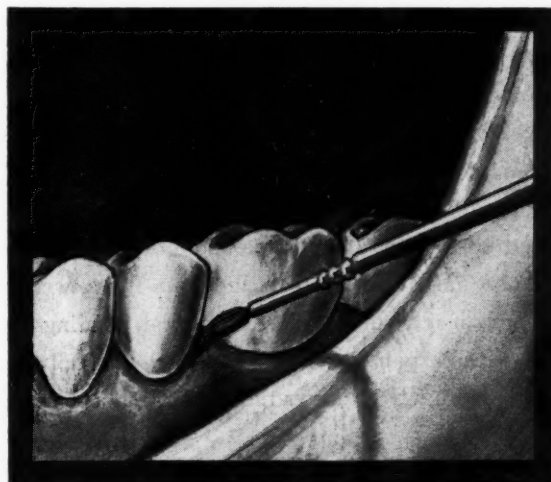


5

Application of Medicament to Gingival Tissue

Fabian T. Bofenkamp, D.D.S., Fort Logan, Colo.

6. A convenient method of applying a medicament to the gingival tissues, especially in the interproximal spaces and under the free margins, is to use a small inlay or artist's brush of good quality. After use the brush is washed and sterilized in a cool sterilizing solution.



6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time. Turn to page 330 for a convenient form to use.

Send your ideas to: Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

The EDITOR'S Page

THE TREATMENT for dental caries is definitive and well standardized. Not so for periodontal disease. The confusion that exists in this field is expressed by the multiplicity of concepts of causation and by the number and variety of methods of treatment.

E. Wilfred Fish¹ of England has been notable for his good sense in evaluating periodontal disease and for his sound approach to treatment. His point of view is that of the clinician. He, with Thomas H. Forde of Washington, D.C., has a dynamic attitude toward periodontia. Although these men both recognize the septic nature of the ulcerative lesions in the periodontal pocket, they are concerned with the dynamic mechanism that produces stress and strain on the periodontal fibers to initiate and to complicate the disease.

The septic lesion must be treated by either biochemical or surgical methods. At the present state of our knowledge it appears that the best results come from the excision of the pocket with subsequent vigorous efforts on the part of the patient to stimulate the residual epithelium to produce a keratinization which will erect a barrier against future invasion.

According to Forde, the law of the lever is as applicable in periodontia as it is in engineering. If the working arm of a tooth is longer than the supporting arm, the stresses are so great that the tooth cannot withstand the repeated masticatory blows. Fish expresses the same general thought; "Teeth whose roots are short by nature tend to loosen more rapidly than those with long roots. And the prognosis depends, therefore, as much on the length of the root as upon the depth of the pocket."

Forde describes the mandible as a flying wedge driving inside the upper arch and tending to produce an expansion of the upper arch by a natural driving force. He pictures the upper arch as having

a powerful tendency to expand and the lower to become compressed. It is this tendency that explains the migration of teeth when the periodontal fibers have been destroyed. As stated by Fish: "The tendency to wander is much more marked in the upper teeth than in the lower ones because the upper arch is outside the lower. Any arch can resist compression, provided the teeth are all in contact, much more sturdily than it can withstand the disruptive effects of expansion which appear in the upper arch when the lower arch is driven into it; the lower arch is compressed and is unaffected; the upper is expanded, and the teeth are spread."

Both Fish and Forde make good use of mechanical splints to control the expansion of the upper arch and the consequent closing of the bite. In general, dentists, and even periodontists, do not avail themselves of this effective measure of supportive treatment.

Wherever dentists meet who are interested in occlusal trauma, the debate may be expected on this subject: Does occlusal trauma *cause* periodontal disease, or is the change in occlusal relationship the *result* of tooth movement that follows pocket formation? Both sides have their advocates and some truth probably prevails for both. A tooth may erupt into a traumatic relationship wherein stress is not distributed parallel to the long axis of the tooth. So long as the tissue tonus is high and the metabolism of the supporting bone is favorable, no destruction of tissue is demonstrable. Youth, in other words, may tolerate such stress — and usually does. With the advancement of age with degeneration and decrease in the resistance of tissue, occlusal trauma can no longer be compensated. A periodontal pocket may be the result. As the lesion develops and fibers and bone are destroyed, the tooth often shifts its position and other points of occlusal trauma may appear. Grinding of teeth, therefore, is often a transitory and not a definitive procedure.

¹Fish, E. Wilfred: The Treatment of Advanced Parodontal Disease, J.D.A.S.A. 5:202-210 (April 15) 1950.



Dermatitis Caused by Antihistamines

The antihistamine drugs have a definite place in controlling many manifestations of allergy. However, these drugs occasionally may act as the causative agents of allergic reactions.

Several reports have been made of the appearance of allergic dermatitis following the ingestion of pyribenzamine. Trimeton and benadryl have caused a dermatitis in a few cases.

Of all the offenders, pyribenzamine ointment seems to be the worst. It may cause varying degrees of contact dermatitis.

The reactions appear to differ from those of other drugs. It is usually noted that the sites of previous contact dermatitis caused by local use of drugs, such as the sulfonamides, flare up when the drug is given by mouth. Such reactions presumably depend on the degree of sensitivity and the concentration of drug in the blood stream.

The antihistamines seem to have only a limited relationship between the reactions caused by the internal use and those caused by external use. This may be due to the relatively small total daily dose of the antihistamines as compared with other drugs.

The antihistamines commonly used today are: (1) pyribenzamine, (2) neo-antergan, (3) thenylene, (4) antistine, (5) diatrin, (6) neohetramine, (7) trimeton, (8) benadryl, and (9) thephorin.

Sherman, William B., and Cooke, Robert A.: *Dermatitis Following the Use of Pyribenzamine and Antistine*, *J. Allergy* 21:63-67 (January) 1950.



Eye Problems in Children

School authorities are becoming increasingly concerned about the eyes of school children. The emphasis today is on visual education and at least 80 per cent of learning comes through the sense of sight.

MEDICINE

and the Biologic Sciences



Within recent years it has been recognized that many of the children who do not do well after the fifth grade are poor readers. At first, when a large number of children with reading disabilities were found, it was believed that the chief source of the difficulty was physical—some optical or muscular defect in the eye which interfered with clear vision.

It is true that the prevalence of refractive errors and of muscle imbalance among children with reading disabilities is much higher than among children who are good readers. However, the experience of many reading clinics proves that eye defects are by no means the whole story. Some children with excellent vision are poor readers. Some children with (1) significant myopia, (2) farsightedness, or (3) astigmatism are good readers. And with most children who are poor readers and who have defective vision, the provision of glasses which brings their vision up to 20/20 or even to 20/15 does not make them good readers.

Other physical factors require consideration: 1. The child should have a general medical examination to rule out anemia, malnutrition, endocrine

deficiencies, hearing loss, and systemic disease. 2. A psychologic check should be made for mental retardation, neurosis, and emotional problems.

In children having reading difficulties the following conditions are frequently found: (1) Inability of the two eyes to work together as a team in focusing a single visual image, (2) imbalance of the ocular muscles, and (3) fatigue of accommodation.

School medical advisers and nurses often ask, "What shall we do when the children are taken to optometrists instead of to ophthalmologists?" In the United States there are only 2,000 ophthalmologists certified by the American Board. There are 18,000 optometrists. Every one of the 48 states licenses optometrists to do refractions and to give eye exercises or orthoptics for muscle imbalance.

Illinois has set up a unique and constructive coordinate optometric and medical eye care plan. When the optometrist sees a school child he agrees to refer the child to an ophthalmologist if there is (1) corrected visual acuity of less than 20/30 in either eye, or (2) any obvious or questionable pathologic alteration of the eye. In case of such referral the ophthalmologist is to send a report of his findings to the optometrist and also to send the child back for refraction if such service is needed.

Foot, Franklin M.: *Progress in Meeting the Eye Problems of Children*, *Am. J. Pub. Health* 40:313-316 (March) 1950.



Initial Treatment of Hemorrhage

Frequently it is difficult to differentiate between severe hemorrhage and less severe hemorrhage. In some persons the relatively small losses of blood may have a profound effect. This is particularly true in patients whose blood volume or circulation has been impaired by other causes. And too, no reliable estimate can be made of the amount of blood lost from accounts given by the patient.

A hemorrhage may be considered severe when blood has been lost at such a rate as to cause symptoms indicating a serious upset in the ratio of blood volume to vascular capacity. Generally speaking, a patient will display disturbing symptoms when an amount of blood equivalent to 2 per cent of his body weight has been lost within twenty-four hours.

When confronted by a patient giving a history or showing signs of a severe hemorrhage the following measures should be taken: (1) Conserve the blood remaining in the body by reducing or checking further loss and devising ways to use blood still in circulation to the greatest advantage.

(2) Make a rapid estimate of the urgency and extent of the need for blood replacement and decide how much and how fast blood (or other fluids) should be given.

(3) Maintain the patient under close observation and aid him in correcting any systemic defects in hemostasis or other dysfunctions that he may have developed.

Patients who are bleeding should be put at rest in a position adjusted to minimize the hemorrhage and whenever possible, have the bleeding area compressed by a suitable device or dressing. Anything that may exert a strain on the bleeding area should be avoided.

The type of posture indicated during a phase of bleeding depends chiefly on the region and system involved:

(1) *Bleeding Into the Brain, Eye, or Ear*—The head and shoulders should be raised slightly above the level of the trunk with the abdomen and lower extremities horizontal.

(2) *Bleeding From the Scalp, Face, Nose, or Mouth*—During waking hours the patient may sit up in bed with the trunk almost at right angles with the hips. At night the body is tilted slightly back. The horizontal posture should be avoided except during circulatory collapse.

(3) *Bleeding From the Throat, Pharynx, Larynx, Lungs, and Lower Respiratory Tract*—The head and

body should be flat in bed with the head turned sideways. Sometimes it may be advisable to have the head lower than the shoulders to allow the extravasated blood to escape from the mouth and not go down to the trachea.

(4) *Bleeding From the Gastrointestinal or Urogenital Tracts*—The patient should lie flat in bed.

(5) *Bleeding From the Extremities*—The arm or leg should be raised and all constricting clothing removed.

Tourniquets may be used to advantage for the temporary arrest of bleeding if the injury is below the upper fourth of the extremity. Compression dressings are frequently helpful. It is a common error to apply too much pressure when using compression dressings.

Peripheral vasoconstriction is among the most effective natural reactions of the body to conserve the blood. Besides helping the arrest of bleeding by reducing the caliber of vessels and the flow of blood within them, it brings total vascular capacity down to within the limits of the diminished blood volume. Heat should not be applied to the body at this time, as it will produce (1) vasodilation, and (2) increased vascular capacity, and (3) will accelerate metabolism and thereby accentuate the existing deficiency of blood volume.

Replacement of body fluids and treatment of shock are indicated in most cases of severe hemorrhage. The patient's nutritional requirements must also be met in order to restore the normal physiologic status.

Tocantins, Leandro M.: *Practical Considerations in the Conservation and Replacement of Blood in Severe Hemorrhage*, *M. Clin. North America* 33:1555-1563 (November) 1949.



Rh Factor

In preparation for blood transfusion it is essential that both the blood of the donor and the blood of the donee be examined to determine the Rh reaction. The Rh factor is really

a complex, composed of the subgroups Rh₀, Rh¹, and Rh¹¹. Eighty-five per cent of Caucasians possess the Rh₀ factor as well as one or both of the others. About 3½ per cent possess only one factor and about 13 per cent lack all three factors. These persons are the true Rh negative persons although this term is usually applied to those lacking the Rh₀ factor.

The Rh factor acts as an antigen and may stimulate the production of antibodies if introduced into the blood of an Rh negative person. This may be accomplished by blood transfusion or by pregnancy produced in an Rh negative woman by an Rh positive man.

In pregnancy the process of antibody formation is a gradual one so that in the first pregnancy the antibodies cannot be detected. Once the antibodies are formed, they may cross the placental barrier from mother to child in a subsequent pregnancy and attack the red cells carrying the Rh factor, thus producing hemolytic disease.

Clinically, three types of hemolytic disease can be recognized: (1) The hydropic type with a mortality of nearly 100 per cent, (2) the icteric type with a mortality of 40 to 50 per cent, and (3) the anemic type with a risk of 15 to 20 per cent. The infant may die in the uterus days or weeks before delivery or may die shortly after birth. After birth, if proper treatment is promptly administered the infant may survive.

Once sensitization of a woman is established it persists throughout life. If she has lost a child from hemolytic disease all subsequent Rh positive children borne by her will suffer the same fate. Fortunately, this mother-to-child antibody transfer does not always occur or it may be so slight as to be of no consequence. And too, about 50 per cent of such women are not capable of sensitization.

Of the 15 per 100 women who are Rh negative, (1) some are not in the childbearing age, (2) some are not married, and (3) a few are married to Rh negative men. Hence, only about 9 per cent of all pregnancies

occur in Rh negative women married to Rh positive men and many of these women are not susceptible of sensitization. Only in about 1 to 350-400 deliveries, therefore, will the child be affected in a varying degree with hemolytic disease of the newborn.

The disease will not occur in the first term pregnancy unless the mother has been sensitized by (1) blood transfusion, or (2) by a pregnancy which has progressed to four or five months or more before abortion occurred. The disease is most often noted in the second or third, and subsequent pregnancies.

Once sensitization is established it is permanent. Research is being made with an agent to desensitize persons so afflicted.

As far as transfusion is concerned, the clinical implication is clear. Rh typing should be routine and no Rh negative person, male or female, should receive Rh positive blood. If this has been done, (A) in the days before the Rh factor was known, or (B) in case of great urgency, that patient should under no circumstances be transfused with Rh positive blood. The risk of a fatal reaction would be too great.

The Rh type of every pregnant woman should be determined early. If she is Rh negative and has had a transfusion, the Rh type of the transfused blood should be ascertained, if possible. Also, the Rh status of her husband and of other children should be determined.

After delivery, the Rh type of the baby and a study of its blood should be performed at once. If the baby is Rh positive and is jaundiced or anemic with an abnormally high percentage of erythroblasts, transfusion with Rh negative blood should be performed at once. The same is true if the baby is Rh negative and the clinical picture is that of hemolytic disease. Many complications are averted and many lives saved when these precautions are recognized and prompt treatment instituted.

King, E. L.: *The Rh Factor, Surg., Gynec. & Obst.* 89:562-566 (September) 1949.



Summer Colds vs. Poliomyelitis

The stark realism of poliomyelitis struck many an unsuspecting home during the past year. Compared to that of previous years the incidence was extremely high. The number of fatalities was high and the suffering to permanently afflicted victims can never be evaluated.

It is mandatory, therefore, that we should be suspicious of any condition associated with the disease. One of these conditions, found during the summer months, has been termed, "summer grippé, summer colds, or summer sore throat." The importance of these conditions has been minimized although many clinicians believe the condition to be more serious than it appears to be. There is ample evidence to show that the condition is clearly associated with the virus of poliomyelitis.

The absence of a simple laboratory test for infection with poliomyelitis makes it impossible for the practitioner to distinguish with certainty between epidemics of minor illness which are due to the virus of poliomyelitis and those which are due to other causes. If the poliomyelitis virus is borne in mind, the physician is justified in restricting the activities (such as exhausting play or exercise) of patients with "summer grippé or sore throat" in order to decrease the chances of converting a nonparalytic infection into the frank paralytic form.

It is not absolutely certain whether excessive exercise may play the same role in relation to infection with strains of poliomyelitis of low virulence that it is suspected of playing in infections with more virulent strains. However, virulence is probably always a relative quality and under certain conditions, of which fatigue can be one, an invading infection that is ordinarily of low virulence may produce disproportionate damage.

These contentions are not idle conjectures; they are supported with ample evidence. During the summer

of 1948 there was an unusually high incidence of poliomyelitis in Cincinnati. There was also a high incidence of "summer grippé and sore throat." Large numbers of these mild cases were never seen by the physicians. However, many were seen and some were thoroughly investigated and followed.

It was demonstrated that strains of poliomyelitis virus of high virulence for monkeys can be recovered from persons without any signs of illness or with minor illness. It is believed that, as a rule, these persons have been closely associated with patients with clinically recognizable paralytic or nonparalytic poliomyelitis. The difference in reactions in patients seem to support the concept that the "host factor" is important in determining the form which infection with poliomyelitis virus will take in human beings. This has been demonstrated in other virus diseases. The response to measles varies in many known susceptibles.

The importance of the relationship of "summer colds, summer grippé, and summer sore throat" to poliomyelitis is evident. Children are prone to overdo their activities in the summer months, often in the presence of "summer colds." This can be a dangerous cycle. And until more is known it is wise to restrict their vigorous activities and to show more respect toward minor infections.

Editorial: Epidemic "Summer Grippé" and Poliomyelitis, Internat. M. Digest 55:122-124 (August) 1949.



Rheumatic Heart Disease at High Altitude

Statistics reveal that for twenty years Colorado has been among the first five states in deaths from rheumatic heart disease among school children. As a result it has been suggested that there is a possible relationship between increasing altitudes and the prevalence of rheumatic heart disease. One report showed a higher incidence of rheumatic heart disease among adults who die of heart dis-

ease in Mexico, D. F. where the altitude is 8,000 feet, than anywhere else in the world.

The altitude of Denver is 5,183 feet. A comprehensive survey of large numbers of school children in Denver showed a prevalence of 1.6 per cent of rheumatic heart disease. This is not unusual when compared with that of other areas.

In order to learn more about the relatively high death rate from rheumatic heart disease among children in Colorado it was decided to examine children living at altitudes of 10,000 feet or above. The primary objective was to note (1) reflection of unusually high prevalence rates, or (2) unusually severe forms of rheumatic heart disease among children living at high altitudes.

From this survey it is apparent that rheumatic heart disease is not unusually prevalent or severe in children living at high altitudes (10,000 feet or above.) It is now known for certainty that the prevalence of rheumatic heart disease among children in Colorado is not unusual although the death rate is high.

These studies point out the fact that if all children with heart disease are identified and given the benefit of all possible therapeutic and prophylactic procedures, a substantial number of lives will be prolonged.

Wedum, Bernice G.; Darley, Ward; and Rhodes, Paul H.: *Prevalence of Rheumatic Heart Disease at High Altitudes*, *Am. J. Dis. Child.* 79:205-210 (February) 1950.



Production of Cortisone

The clinical evidence of the efficacy of "Cortisone" of "Compound E" in bringing miraculous relief to arthritics is steadily mounting. Unfortunately, however, quantity production is still an extremely difficult problem.

Under existing facilities only small amounts of the drug are possible. And the cost makes it prohibitive to the hundreds of thousands of victims of rheumatoid arthritis.

The production of "Compound E" is an extraordinarily difficult and costly process. It requires more than thirty separate, time-consuming chemical reactions.

To produce this compound from its first step to the finished product now requires many months. It is believed that a new method of synthesis will have to be developed before sufficient "Compound E" can be made generally available, and at a reasonable cost. Considerable work is being done to accomplish these ends.

The drug was originally developed from a bile acid from the gall bladders of cattle. Extensive clinical tests showed that as a maintenance medication, rather than as a treatment intended to produce a cure of the condition, remarkable results were obtained with arthritic patients. There were a minimum of unfavorable side reactions.

After the development of the compound from the bile acid the next step was production by chemical synthesis. This took much time and work on the part of several investigators. Not until late in 1948 was sufficient material accumulated to produce the small amounts of "Compound E" that were necessary for preliminary clinical evaluation.

The major problem now is the development of "Cortisone" in quantities sufficient for the relief of the large numbers of sufferers from rheumatoid arthritis. The limited production of today is sufficient only for the continuation of the clinical experimentation. The situation is similar to that which existed during the early stages of penicillin production.

Article: *Quantity Production of Cortisone, Arthritis Drug, Still Far Off*, *Hosp. Management* 68:78-80 (August) 1949.



Hyaluronidase and Syphilis

The peculiar tissue selectivity of *Treponema pallidum* remains unexplained. Involvement of the central nervous and cardiovascular systems with sparing of other structures is the rule in late acquired syphilis.

The occurrence of gummas in skin, mucosa and bone is commonplace as is involvement of such organs as the stomach, liver, larynx, and testis. In contrast, gummas of the spleen and pancreas and of the other glands of internal secretion are of great rarity.

It seems possible that the affinity of *T. pallidum* for certain tissues may be, at least in part, related to the type of supporting ground substance along with its permeability. This permeability may be affected by spreading factors such as hyaluronidase produced either by the host or perhaps even the spirochete itself. (This same type of spreading factor is being combined with local anesthetics and solutions used in some intravenous injections.)

The ground substance is composed of simple and specialized types of connective tissue. This surrounds and supports the more highly differentiated cellular structures. Through this ground substance or intercellular matrix, must pass all materials in transit from body fluids to individual cells.

The connective tissue is not in a fixed state. It is unstable and changing. This makes it a permeable network. The degree of permeability is in a state of dynamic equilibrium which is affected by a variety of substances. Some increase permeability and some decrease permeability.

Substances which increase permeability have been termed "spreading factors." One of the earliest discovered and most potent has been found in mammalian testicular extracts. Subsequently, a similar substance has been isolated from snake venom, leeches, and from the capsules of certain invasive bacteria. This substance has been identified as an enzyme (hyaluronidase.)

Physiologic factors including age, sex, constitutional factors, and individual and regional characteristics of the skin have been found to be important factors in connective tissue permeability. Certain of the sex hormones have been shown to exert a modifying effect. The administration of estrogenic substances results in decreased connective tissue permeability; corpus luteum and gonadotropic

hormones have the opposite effect.

Syphilis is more severe in males than in females, not only in its early manifestations but throughout the entire course of the disease. In late syphilis the incidence of neuraxis and cardiovascular involvement is several times greater in the male than in the female. One type of benign late syphilis is of particular interest. Gumma of the male genital organs is common in comparison with late syphilis

of the female genitals which is of extraordinary rarity if it occurs at all.

Syphilis is milder in castrated males than in normal males. This fact has been demonstrated in experiments with rabbits. Also it is recognized that lesions of early syphilis occur frequently at previously traumatized areas. Some factor elaborated by rapidly proliferating tissue favors the growth of *T. pallidum*. It seems possible that this growth producing sub-

stance may be "spreading factor."

The relationship of these findings to the use of hyaluronidase in practice is intriguing. Considerable work is being done and the results should be interesting.

Scott, Virgil: *Speculations on the Role of Spreading Factor (Hyaluronidase) in Experimental and Human Syphilis*, *Am. J. Syph. Gonorr. Ven. Dis.* 33:424-428 (September) 1949.

Trophopathic Diseases or Systemic Nutritional Disturbances as Reflected in the Mouth

GRANT H. LAING, M.S., M.D., Chicago

THE TERM trophopathic diseases is suggested as a classification of a group of systemic clinical entities due primarily to nutritional disturbances which dentists see reflected in the oral cavity.

Common Denominator

Although pathologically different anatomic systems are predominantly involved, it is possible that there is a common denominator as an etiologic basis in (1) sprue, (2) pellagra, (3) pernicious anemia, and (4) certain degenerative diseases of the central nervous system. This common denominator is fundamentally a disturbance of nutrition based on a failure of certain enzyme systems to function normally.

Atomic and Nuclear Forces

The concept that atomic and nuclear forces dominate all the metabolic processes of the human body is under consideration. In order to diagnose human diseases intelligently and plan logically for adequate remedy the following must be understood:

1. All the millions of changes constantly in progress in every human organism are either normal or abnormal, depending upon the balancing of the positive and negative electrical forces of the reacting component.
2. All the activities of the body, physical and mental, may be looked upon as being activated by differences in electrical potential, between the atoms and the molecules, inside and outside the billions of cells of which our bodies are made.

The Enzymes

It is a particular form of combination (the enzyme form) which controls the activities of all other substances and reactions in the body. This type of product, made up in great variety of positive and negative radicals, especially balanced for specific purposes, directs the course of the metabolic processes of the human organism.

Definition — Enzymes may be viewed as a three-way combination of a metal, a specific protein complex, and one or more vitamins.

Enzymes and the Control of Disease—The nature of the activities of the enzymes obviously depends upon the kinds of metals, vitamins, and proteins involved. They are the things which first get out of gear when the processes of the body become abnormal. The prevention or remedy of disease therefore, must come through the proper use or manipulation of the enzyme systems.

The Role of the Enzymes in Dentistry

Many enzyme systems are involved in the growth of the tooth, its normal nutrition, and its repair processes.

Alkaline Phosphatase — 1. This enzyme is activated by magnesium and has to do with the deposition of calcium and phosphorus in tooth structures and bone in general.

2. Alkaline phosphatase is also concerned in the metabolism of phospholipids of the nervous system, carbohydrates, and nucleotides.

The Principal Enzyme in Saliva—

Ptyalin, which is an amylase, is the principal enzyme in human saliva. There are also present urease, protease, lipase, maltase, and catalase.

A Protective Agent—There is some evidence that urease aids in protecting tooth structure from caries decomposition by forming ammonia from the urea present in the saliva, thus producing alkalinity which tends to offset the damaging effects of the acid-producing bacteria.


The tongue is an organ which may reflect many pathologic states resulting from the imbalance of various enzymatic systems. Among these are the disease entities known as sprue, pellagra, and pernicious anemia.

Allied Nutritional Diseases

Although these are three separate diseases, it has been pointed out that there are many symptoms common to all of them; namely, gastrointestinal symptoms, neurologic manifestations, and a macrocytic anemia.

Pellagra

Clinically, the classical symptoms of pellagra, diarrhea, dementia, and dermatitis, are seldom seen except in advanced cases. Early in the disease the tongue is red and swollen at the tip and lateral margins and there is often a burning sensation which may extend down into the esophagus and stomach. Glossitis and the neurologic symptoms have been found to be the commonest symptoms, occurring in persons with bad food habits which may or may not be associated with alcoholism.



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Sprue

Although it is generally agreed that tropical sprue, nontropical sprue, and celiac disease are fundamentally the same condition, there may be involvement of several systems: 1. If certain nutritional defects are dominant, the disease is classified as macrocytic hypochromic anemia although diarrhea is one of the major complaints.

2. Glossitis may precede diarrhea by many months, the tongue and mouth become sensitive, and a stomatitis develops.

3. Later the tongue becomes beefy red with atrophy of the filiform papillae, and eventually, smooth and shiny.

4. Paresthesias (numbness) of the hands and feet is common.

5. Depression, memory loss, irritability, and emotional instability may occur.

6. In such persons the diet has been excessive in carbohydrates and low in proteins, as in pellagra.

Demyelination

The neurologic facts in the nutritional diseases of sprue, pernicious

anemia, and pellagra are due to the partial loss of the nerve coverings or sheaths, a process called demyelination.

Function of the Myelin Sheath—1. One of the functions of the myelin sheath is to protect the nerves against irritation or damage. 2. Another is to aid in the transmission of nerve impulses.

The Role of Thiamin—(1) Thiamin is essential in maintaining the energy supply of the myelin sheath, and (2) in metabolizing galactose with the formation of galactolipids which constitute about one-third of the lipids of the white matter of brain tissue.

The Composition of Thiamin—Thiamin is the coenzyme of the enzyme carboxylase, which catalyzes one of the steps in the oxidative metabolism of carbohydrates, such as glucose. Disturbance of this mechanism at this stage leads to an accumulation of pyruvic acid which aggravates the breaking down of the myelin sheath.

Related Diseases

The common denominator of the three disease entities discussed, in reference to the nervous system, is demyelination. Although apparently unrelated, several other diseases among which are the following share the pathologic process: (1) multiple sclerosis, (2) amyotrophic lateral sclerosis, (3) Friedreich's disease, (4) Schilder's disease, (5) Devic's disease, and (6) certain types of neuritis.

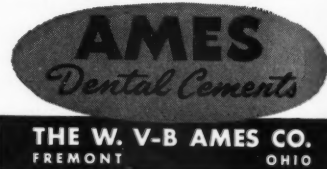
A Chronic Disease of the Central Nervous System—Multiple sclerosis, often called disseminated sclerosis, is one of the commonest chronic diseases of the central nervous system. The cause is unknown although experiments have suggested a possible relationship with sensitization.

A Marked Characteristic—It is emphasized that nervous tissue exhibits a distinct preference for carbohydrates as a source of metabolic energy:

1. Glucose and its equivalents are constantly utilized in the maintenance of nerve form and stability, as well as in the energizing of nerve activities.

**Why wait until you think,
and say—**

**"I should
have used
Ames Crown
and Bridge
Cement."**



2. Interference with the processes of conversion of carbohydrates to their ultimate breakdown products of carbon dioxide and water is apt to result in nerve irritation or some degree of dysfunction.

The Conversion of Glucose—There are eleven distinct steps in the transition pathway in the conversion of glucose, by the step-wise addition of phosphates, to simple organic acids, such as pyruvic, lactic, acetic, and carbonic. Each step liberates an additional amount of energy and is activated by a different enzyme.

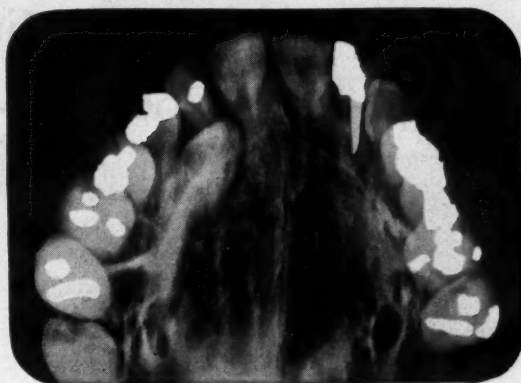
The Energy Carriers—Through enzyme systems of their own these phosphates operate a "shuttle system" between the end products of one reaction and the starting components of the next.

Strategic Factors

Enzyme systems are strategic factors in all bodily problems. Some of the substances which commonly inactivate such enzyme systems are the following:

1. *Bacteriotoxins* — Pneumonia,

In certain conditions, periapical and interproximal (Bite-Wing) radiographs do not furnish sufficient radiodontic data for diagnosis. Then, occlusal radiography is essential...



to provide additional information

For instance, a neoplasm, an impaction, or a cyst may call for information not available from the basic periapical examination. Or a condition may be encountered where usual intraoral examinations are impossible—trismus, for example. Then the answer—an effective

supplement or a practical expedient—is occlusal radiography.

Indispensable, however, is a complete periapical examination for each patient... with subsequent studies of areas that require watching and periodic interproximal radiography.

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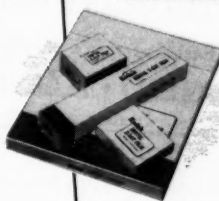
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Illinois Dental Journal: "All in all, I consider this book to be one of distinction and clarity, and the author has provided us a factual background for intelligent thinking on a very timely subject. The book is recommended most heartily."

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4. *Mineral Deficiencies*—Iodine deficiency, found through the so-called goiter belt of the United States, is a typical example.

5. *Mineral Excesses*—Too much potassium, iron, and fluorine.

6. *Vitamin and Essential Amino Acid Deficiencies*—An illustration of the profound effect of system involve-

ment on oral manifestations is the transverse ridging of the teeth as found in acute infections such as (1) scarlet fever, (2) a poorly controlled diabetic child, or (3) a rachitic child. A marked disturbance in metabolism results in a temporary interference with tooth growth.

7. *Vitamin Excesses*—Rich sources of Vitamins A and D may be toxic when given to excess.

8. *Antivitamins*—It has been shown that certain antivitamins can produce a state of avitaminosis by displacing the vitamins competitively

from catalytic complexes. All antivitamins do not necessarily exhibit similar pharmacologic effects but it is possible that each antivitamin would selectively poison only a particular portion of the nervous system, as well as only particular organs. A series of antivitamins should provide numerous pharmacologic agents which are reversible by the addition of the vitamins they imitate.

Mineral Elements

In the few enzyme systems involved in nerve, brain, and muscle tissue at least the following mineral elements participate:

Sulphur	Phosphorus
Magnesium	Zinc
Manganese	Cobalt
Calcium	Iron
	Copper

The Relation of Bodily Health with Minerals—The presence of these minerals is evidence that the diseases which involve primarily (1) the bone marrow, (2) the blood stream, (3) the lungs, (4) the stomach, (5) the teeth, (6) the muscles, (7) the nerves, and (8) all the organs and parts of the body are intimately related to the problem of the mineralization of soils.

Loss of Mineral Elements from the Soil—The agricultural soils of the United States are being alarmingly reduced in minerals by (1) cropping, and (2) erosion through wind and water.

Gains—The additions of fertilizers, manures, bedding, rainfall, irrigation, seeds, and fixed nitrogen have somewhat minimized the loss of minerals.

Excessive Size not a Measure of Health—Excessive growth of a plant is not a criterion of its nutritive value for human beings. The principal elements in commercial fertilizer (nitrogen, potash, phosphates, and lime) can produce increasing crop yields but cannot assure crops of the highest nutritive value. An excess of lime will render iron, manganese, boron, and other essential elements relatively unavailable to the plant.

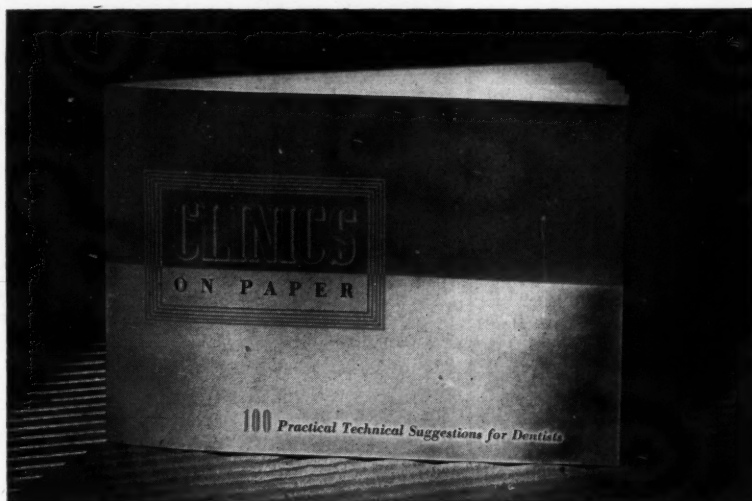
Imbalance of Minerals

Human beings should use as food only plants that are internally sound

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rather than merely healthy in outward appearance.

The Importance of Organic Substances

Plants for food must contain, not only the minerals, but the complex organic substances which plants synthesize through the mediation of the complete soil mineral assortment:

1. *Boron* in the soil increases the Vitamin A content of apples.

2. *Manganese* enhances the vitamin content of tomatoes, strawberries, and other fruits.

3. *Copper* is an important factor in the formation of hemoglobin. It is also a component of the ascorbic oxidase enzyme and of the enzymes tyrosinase which has to do with the metabolism of tyrosine, one of the vital amino acids. Copper in excess, however, can become a body poison.

4. *Zinc* is associated with (1) the production of insulin, (2) the release of carbon dioxide from the blood into the lung spaces, (3) with the formation of gastric juice by the stomach mucosa, (4) is a component of the enzyme, carbonic anhydrase, where it is concerned with the speed of impulse transmission in the nervous system. The concentration of zinc in the dentin is many times greater than in the blood stream and yet none of it appears in the enamel.

The Results of Soil Deficiencies

1. Research has shown conclusively that even minor deficiencies of the so-called trace minerals in soil greatly alter the character of the protein content of animal and human foods.

2. As the calcium content of soils is varied, the ratios of the amino acids of hay, alfalfa, and lespedeza are materially altered.

3. The composition of any crop grown in the United States fifty or a hundred years ago was quite different from the composition of the same crop grown in the same soil today.

4. A balance exists in nature which cannot safely be ignored and applies first to soil, then to plants, animals, and man who acquires all the ele-

ments that form his makeup from these sources.

Conclusions

1. Based on the concept of the electrical constitution of matter it is evident that all change is organic and that the mind and body cannot be separated.

2. It would be more logical to ascribe negative factors as the primary causative factors in many diseases. The lack of substances or the failure to utilize them produce disturbances

in the enzyme system which result in an unbalanced state in the organism, termed a morbid state or disease.

3. Trophopathic diseases are primarily caused by disturbances in nutrition.

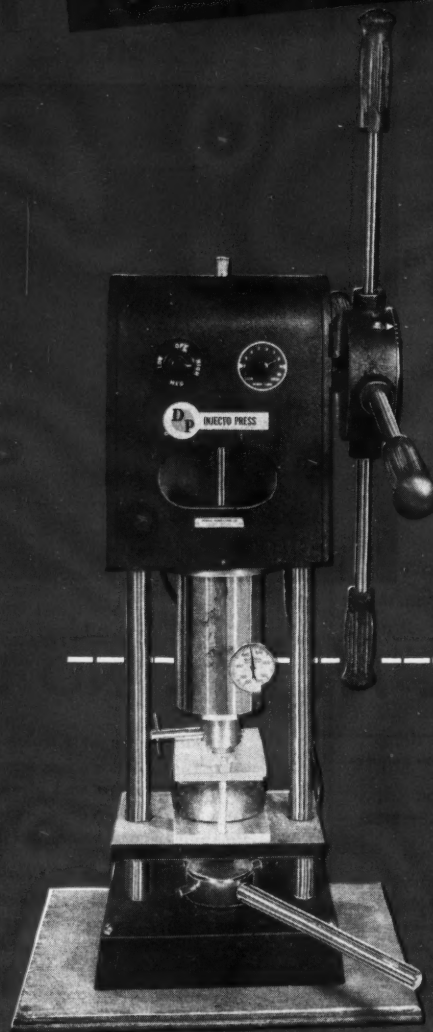
4. When viewing these trophopathic diseases physicians and dentists must bear in mind that some of these processes are less reversible than has been thought in the past.

Adapted from *The Fortnightly Review of the Chicago Dental Society* 18:5-28 (October) 1949.

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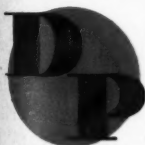


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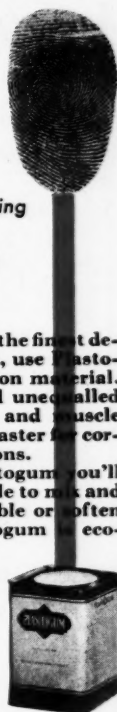
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chologic regressions by partial physiologic regression. It is as if he chooses physical symptoms to nervous and mental distress. Not that such a choice is a conscious or deliberate one. The choosing is made in the dark unknown depths of the personality where the exact mechanism will probably always remain hidden despite the skills of the soul searchers and the personality probers.

Many people pay a fabulous price for their apparent equanimity! Their perfect external poise, their low and well-controlled voices, their smiling faces free from the furrows of annoyance—these are all external signs that win public approval but the tribute exacted may be costly to the person himself.

There are people who are both externally and internally serene. They have made an adjustment to the outside world and to their internal world of ambitions, phantasies, and desires. They work honestly without trying a one-man reformation; they have learned to adjust themselves to oth-

CLINICAL AND LABORATORY SUGGESTIONS

(See pages 316 and 317)

Form to be Used by Contributors

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From: _____

Subject: _____

Explanation of Procedure:

Sketch:

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ers; they have acquired by effort or from good heritage a philosophy that expects more from themselves than they demand from others.

In colloquial speech we often describe these well-integrated people as those who are able "to take everything in stride." Whoever coined that expression was penetrating and eloquent. A runner in form and easy stride is not thrown off his form by the wind across his path, by the stones at his feet, by the shouting of the spectators. So it is with one who moves through life at an even stride. Neither the tempests of rage nor the internal gnawings of anxiety move him off his true course.

Write Less and Say More

Walter C. Alvarez of the Mayo Clinic is known to me only by his writings and his reputation. He strikes me as an unusually sensible person and since I read what he says about shortening scientific papers, I am even more impressed with his good sense:

"There has always been a need for shortening papers, but today this is becoming acute. With the soaring costs of printing and production, editors and publishers of journals are being compelled to cut down the number of pages per volume. A journal which, in 1947, made money may today be facing a deficit.

"Another difficulty is that today no man can keep up with all that is being published, even in his specialty. Under these circumstances, the writer whose papers are most likely to be read is the one who makes them short and interesting. If he interrupts his text with boring material, many readers will quickly turn over the pages to the next article.

"Today, the ablest physicians, whose attention all writers want most to attract, are in the habit of quickly skimming through large numbers of articles, looking always for one thing, and that is something new, significant, important and usable. Without any of the accompanying rehash, this grain of wheat could usually have been reported on a page or two.

"Fortunately, most papers are not injured by shortening; they really

are improved, and the author is benefited.

"The worst thing a man can do is to write pages of introduction filled with tiresome statements the truth of which everyone knows, such as that the etiology of the disease under discussion is obscure and that some have said this and some that without getting anywhere. The ablest writers try at the start to so grip the interest of the reader that he will want to go on and see what was done and found.

"Having excited interest the writer will try to hang on to it. The last thing he will want to do will be to put in extraneous or uninteresting material which will cause the reader to give up.

"Many writers discourage their readers by inserting early in the paper a page or two on needless statistics or on the technique used. A wise writer will put these details in an appendix at the end of his article where they will not interrupt the flow of the argument.

"Big tables should usually be left out because so few readers stop to study them, and the cost of setting them is great. Oftentimes the data in several tables could, with great advantage, be shown in a graph or two or could be summarized in a couple of sentences. The reader does not want to have to stop and dig out the information; he wants it epitomized and given him by the author.

"The summary should be written with particular care, because today most readers and most abstractors read only this part of an article. When a writer fails in his summary to mention all the important things he found he cheats himself.

"There probably never was a good paper which was not worked over several or many times. The writer will do well to search through his pages for every sentence and word that can be deleted without taking from the essential message. Every sentence that is vague should be rewritten until it can have but one meaning and that an obvious one. Finally, the writer who would have his papers widely read will do well to use, when possible, the short Anglo-Saxon word

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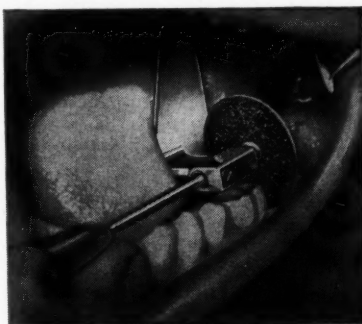
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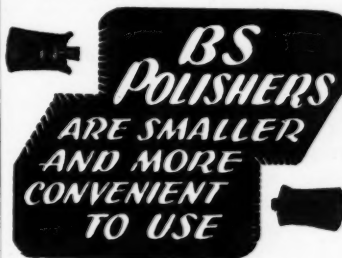
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FATIGUE— the Common Enemy of Dentistry

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The practice of dentistry exacts a heavy toll in physical and mental energy from its practitioners. Many a dentist doesn't realize that he is in danger of becoming seriously fatigued and does not heed the warning signals of listlessness, restless sleep, and a "tired feeling" until the condition has become serious enough to interfere with his work. No dentist should permit himself to drift to this point.

Every dentist should, from time to time, "take stock" of his mental and physical energy honestly—and without making the excuse that "Perhaps I'm just getting old"—and decide for himself whether or not he is expending this precious commodity without getting proper return for it. Doctor S. J. Levy's article tells how to go about the self-analysis and self-discipline that prevent mental exhaustion.

★ ★ ★

"New Faces for Old" is the story of Doctor Herbert K. Cooper's remarkable work at the Lancaster Cleft Palate Clinic. Since 1938, this clinic has been admitting children with disfigured faces, speech difficulties, and warped personalities, and sending

them back into the world as capable, oriented individuals whose appearance does not differ very much from that of other human beings. The dentist who has done so much with comparatively little financial help, now seeks funds to expand the clinic so that more children may be helped. Do you know any philanthropist who might be interested in helping this very worthy project?

★ ★ ★

"Psychosomatic Sleep in Dentistry" explains the use of hypnotic suggestion as both a physiologic and psychologic aid to dentistry. Doctor S. Irwin Shaw writes the interesting article.

★ ★ ★

"Should the Dentist Buy an Established Practice?" is an excellent analysis of methods that should help the young dentist decide whether to buy a practice or establish his own.

★ ★ ★

"Collecting Cash—Painlessly" gives tips on collecting over-due accounts with a minimum of effort and embarrassment. It includes a pattern-letter which has proved effective in actual use.

★ ★ ★

In addition to these articles, there are short items and the regular monthly departments to furnish interesting and instructive spare-moment reading.

injured by shortening; they really rather than the long one of Latin or Greek derivation. This makes for easier reading; and the tired doctor, when he comes home at night from what he hopes is his last call, much appreciates easy reading, with simple English words and short and simply constructed sentences."

The popularity of the "digest" type and pictorial magazines proves that all readers want their task made easy. The more the writer renovates and revises his material, the easier the task for the editor. The more the editor condenses and simplifies the material, the simpler the job for the reader. "Easy reading means hard writing," is a slogan that should not be forgotten by anyone who writes. And writing includes more than preparing scholarly essays or scientific articles. Writing a letter, preparing a set of directions or instructions, a note to the milkman, a committee report—all require clarity and simplicity to prevent the bugaboo of communication failure.

A Note on Exercise

Now that the summer is here it is the season for the he-men and their violent exercise. This is the time that sees the week-end athletes in full bloom playing their thirty-six holes of golf a day, or doing their mountain climbing and similar strenuous exercises.

Anyone who is a confirmed but-tocks-in-the-hammock man will take joy from what an unknown writer, rich in wisdom, has said: "Exercise to most people means the usual highly paced, competitive, harmful, imitation warfare games and gymnastics taught so assiduously in our schools."

I like particularly the expression "imitation warfare games." Some of my golfing friends take the game as hard as commandos storming a beach-head. In my time I was a daybreak man myself, charging over the terrain under the bombardment of stray club-fire. The fishermen carry on a humorless and ruthless campaign using every conceivable kind of booby trap to destroy their prey. Survivors of a battleship sinking, adrift in their

life rafts had nothing on the days I have spent trolling under the hot sun for muskellunge, which, by the way, were usually hiding elsewhere.

Of all the sportsmen, no one plays the imitation warfare game with such seriousness as do the hunters. I have friends who ordinarily speak in prosaic language but who sparkle in blank verse or in iambic pentameter when they describe the beauty of a duck blind at dawn. I prefer a warm bed myself.

To be sure, the body needs a certain amount of exercise to keep the tissues in tone but like any other good thing, exercise may be overdone. A sort of rule of thumb might be: If exercise leaves one stimulated and refreshed, it is good; if it leaves one flat on his face from exhaustion, it is no good.—E. J. R.

Clinical Analysis of Dental Caries

1. A correlation of clinical observations with those of the research laboratory suggests a lack of some data regarding the cause of initial caries.

2. Clinically, two types of caries lesions are generally observed: Type A, large orifice, shallow caries penetration, located on smooth tooth surfaces, such as proximal, labial, or buccal areas. Type B, small orifice, deep penetration, originating in enamel fissures of occlusal surfaces of molars and bicuspid.

3. Morphologic differences in these two types of cavities may be due in part to their different locations on teeth. Another factor, only now receiving consideration, is the distribution of the organic enamel matrix.

4. The activity of lactobacilli, generally regarded as the factor responsible for the carious destruction of the enamel, may be typified in type A lesions.

5. In type B lesions, on the other hand, the destructive agent appears to have no affinity for mineral elements of the enamel. Here caries progresses almost entirely along the permeable protein pathways of the enamel.

6. These protein pathways in enamel are: lamellae, tufts, rod sheaths, and spindles; in dentin, a profusion of tubule endings.

7. The character of the destructive factor of the protein enamel matrix appears obscure; it may be an enzyme or an acid.

8. Permeable enamel lamellae appear responsible for permitting the entrance of the carious process to the dentin, leaving the tooth surface almost intact.

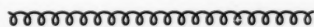
9. Topical application of sodium fluoride and impregnation increase the resistance of enamel to attack.

10. These observations support the hypothesis that the condition of the organic matrix is of greater importance in maintaining tooth resistance to caries than the degree of enamel calcification.

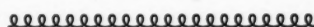
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